

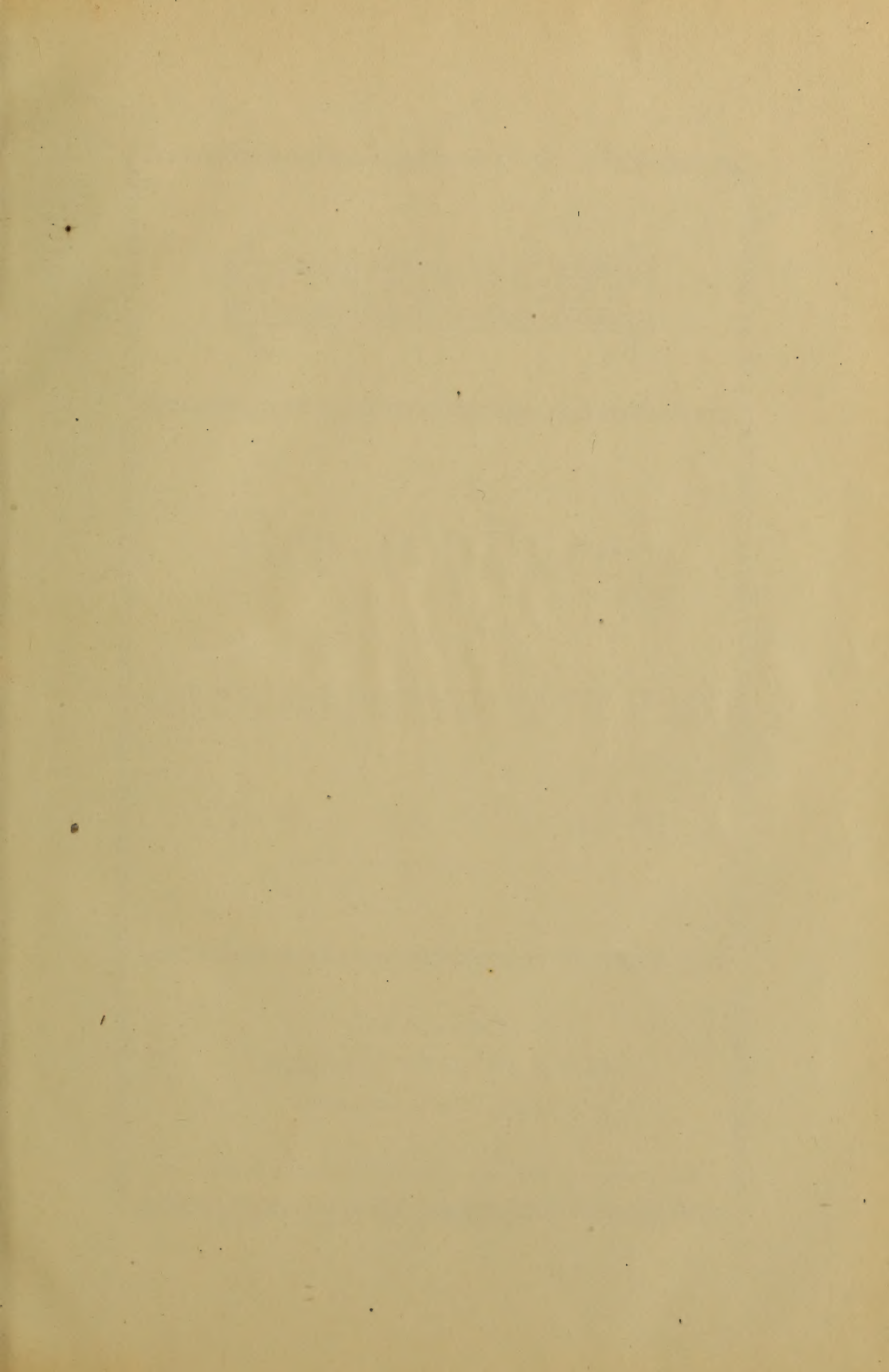
S F
523

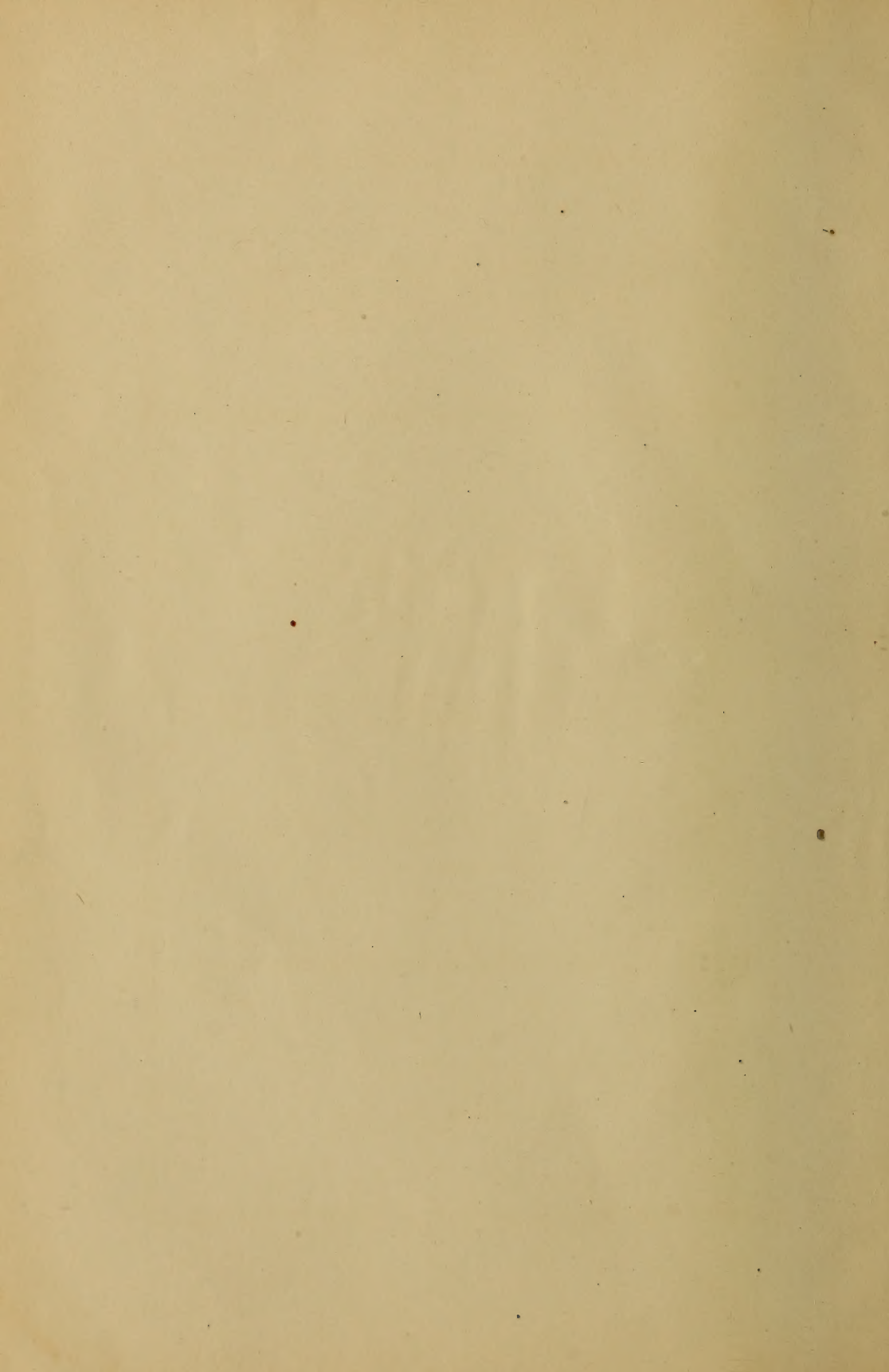
.N55

LIBRARY OF CONGRESS.

Chap. SF523 Copyright No.
Shelf. N55

UNITED STATES OF AMERICA.







Bee-Culture;

OR.

SUCCESSFUL MANAGEMENT OF THE APIARY,

BY

THOMAS G. NEWMAN,

[Editor of the American Bee Journal.]

CHICAGO:

THOMAS G. NEWMAN & SON,

972 & 974 West Madison Street.

Printed in both English and German; Price 40c. for either Edition.

PUBLICATIONS FOR THE APIARY,

FOR SALE AT THE OFFICE OF

The American Bee Journal,

974 West Madison Street, Chicago, Ill.

COOK'S NEW MANUAL OF THE APIARY.

This is a new edition of Prof. Cook's Manual of the Apiary, entirely re-written, greatly enlarged and superbly illustrated.

Being new, it is fully up with the times on every conceivable subject that interests the apiarist. It is not only instructive, but intensely interesting.

It comprises a full delineation of the anatomy and physiology of the Honey-Bee, illustrated with costly wood engravings, full descriptions of honey-producing plants, trees and shrubs, &c., splendidly illustrated—and last, though not least, detailed instructions for the successful accomplishment of all the various manipulations necessary in the apiary.

This work is a masterly production, and one that no bee-keeper, however limited his means, can afford to do without.

It is printed in the best style of the art, on fine book paper, and superbly illustrated throughout. Price, bound in cloth, \$1.25, postpaid; in paper binding, \$1.00, postpaid.

THE HIVE AND HONEY-BEE, by L. L. Langstroth.

This is a standard volume, well illustrated and nicely printed. Price, \$2.00.

MYSTERIES OF BEE-KEEPING, by M. Quinby.

The author has treated the subject of Bee-Keeping in a manner that cannot fail to interest all who read this work. Price, \$1.50.

THE DZIERZON THEORY; being a full elucidation of Scientific Bee-Keeping.

This "theory" presents in the form of distinct propositions, the fundamental principles of bee-culture, and in this work the late Baron of Berlepsch furnishes a condensed statement of the facts and arguments by which these propositions are demonstrated. It is of untold value to beginners and all others who desire to study the subject of apiculture. It is just what thousands want.

It contains 50 pages and is printed on fine book paper. Price, postpaid, 20 cents, or three copies for 50 cents.

HONEY, AS FOOD AND MEDICINE, by the Editor of the American Bee Journal.

This is a pamphlet of 24 pages, discoursing upon the Ancient History of Bees and Honey; the nature, quality, sources, and preparation of Honey for the Market; Honey, as an article of Food, giving recipes for making Honey Cakes, Cookies, Puddings, Foam, Wines, &c.; and Honey as Medicine, followed by many useful Recipes. It is intended for consumers, and should be scattered by thousands all over the country, and thus assist in creating a demand for honey.—Prices: Single copies, 10 cents postpaid; 15 copies for \$1.00 by mail, postpaid; 100 copies, with name and address of honey-producer printed on them, \$5.00 by mail, postpaid; 250 copies, by express, at 4 cents each; 500 or more copies, by express, at 3 cents each. It is published in German also at the same prices.


WINTERING BEES; How to do it Successfully.

This contains all the Prize Essays on this important subject that were read before the Centennial Bee-Keepers' Association. The prize (\$25 in gold) was awarded to Prof. Cook's Essay, which is reported in full in this pamphlet.

It contains 30 pages and is printed on fine book paper. Price, 15 cents, or five copies for 50 cents.

SPECIAL EDITION of the Journal.

Containing the Official Report of the Proceedings of the National Convention, held in New York, Oct., 16-18, 1877, with all the Essays and Discussions,—together with a description of the implements for the Apiary, on exhibition at the American Institute Fair.—Price 10 cents.

 Send by Postal Money Order, Draft or Registered Letter at our risk.

THOMAS G. NEWMAN & SON,

974 West Madison Street, Chicago, Ill.

BEE CULTURE;

OR,

SUCCESSFUL MANAGEMENT

OF

THE APIARY.

BY

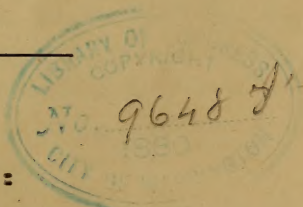
THOMAS G. NEWMAN,

Editor of the "American Bee Journal."

CHICAGO:

THOMAS G. NEWMAN & SON,

1879.



71

SF523
N55

Entered according to Act of Congress, in the year 1878, by
THOMAS G. NEWMAN & SON,
In the Office of the Librarian of Congress, at Washington, D. C.

PREFACE.

It is now everywhere admitted that to be a profitable pursuit, Bee-keeping must be conducted on scientific principles. The old manner of management, (or rather mis-management,) permitting the bees to use log-gums, hollow trees, or old boxes for hives, can no longer be tolerated. The consumer, the retailer, and the wholesale dealer in honey, all demand that surplus honey shall either be extracted from the comb upon scientific principles, by improved machinery, or else be produced in single comb frames or boxes, in order to attract the eye as well as to please the palate.

To induce the practice of scientific management of the apiary is the object of these pages, and to that end we shall not only give our own views and experiences, but we shall also quote from those who have repeatedly practiced with success the plans and manipulations recommended.

This pamphlet is not designed to supersede or supplant any of the valuable works on apiculture already published, but will supply a want for a *cheap* work for the beginner.

When this is thoroughly perused, the enquiring mind is directed to COOK'S MANUAL OF THE APIARY, for a more full treatise on Bee Culture. Prof. Cook is an entomologist, a botanist, a passionate lover of the honey bee, and his work of some 300 pages is the newest and most complete ever yet produced, and receives the hearty endorsement of

THE AUTHOR.



FIG. 53.—*Alsike Clover.*

CONTENTS.

NATURAL HISTORY OF THE HONEY-BEE.

Introduction	11
The Races of Bees	13
The Queen Bee.....	13
The Drone Bee	16
The Worker Bee.....	17
Brood.....	19
Production of Wax and Comb.....	20
Pollen, or Bee-Bread.....	24
Propolis, or Bee Glue.....	24

THE ESTABLISHMENT OF AN APIARY.

Situation, Stocking and Arrangement	25
Bee-Keeping a Science.....	25
Who should keep Bees.....	26
Suitable Location	26
Which way should hives face.....	28
When to commence.....	28
How many Colonies to begin with.....	28
Removing Bees.....	28
What kind of Bees to get.....	29
Buying Swarms.....	30
How to care for a first Colony.....	30
Bees kept on Shares	30
Bees Marking their Location.....	31
Changing the Location.....	31
Preparation of Bees for Winter.....	32
Clipping the Queen's Wings	33
Bee Enemies.....	33
Luck or Science? Which?.....	33
Will Bees Injure Fruit.....	34
Honey Bloom	34

HIVES AND SURPLUS HONEY RECEPTACLES.

The Langstroth Hive	36
The Production of Choice Honey	38
Making Hives and Surplus Boxes	43
How shall Honey be placed upon the Market ?	45
Assort and Grade the Honey.....	47
How to get Bees out of Honey Boxes.....	47
Management of Comb Honey.....	47

THE HONEY EXTRACTOR AND ITS USE.

When to use the Honey Extractor	50
How to Extract.....	52

COMB FOUNDATION AND ITS USE.

Results of Experiments.....	53
New Comb is desirable	54
Fastening Comb Foundation.....	55
How to cut it to desired sizes	55
Should Comb Foundation be Thin or Thick ?	56
Comb Foundation in Surplus Boxes	56
Are the Corrugations Advantageous ?	57
Preserve the Wax.....	57
Facts worth Remembering	58

ITALIANIZING AN APIARY.

Superiority of Italians	59
Introducing a Queen	60
Inserting a Queen-Cell.....	62
Nucleus Colonies.....	64
Dividing the Colonies	65
Swarming ; how to Control it.....	67
How to Hive a Swarm	69
The Loss of the Queen.....	69
What are Fertile Workers	71
Transferring Bees from Box Hives.....	72
Transferring Bees from Movable Frame Hives	74
Uniting Weak Colonies.....	74

MANAGING AND QUIETING BEES.

Feeding Bees.....	75
Robber Bees	75
Quieting and Handling Bees	77
Shipping Queens and Colonies.....	78
Bee Diseases	79

LIST OF ILLUSTRATIONS.

	PAGE.
1. Queen Bee, magnified.....	14
2. Head of Queen, magnified.....	14
3. Ovaries of the Queen, magnified.....	15
4. The Drone Bee, magnified.....	16
5. Head of the Drone, magnified.....	17
6. Worker Bee, magnified	18
7. Head of the Worker Bee, magnified.....	18
8. Anterior Leg of Worker, magnified	19
9. Eggs and Brood, magnified	19
10. Under Surface of Worker showing Wax.....	20
11. Part of a Frame of Brood	23
12. Old-style Langstroth Hive.....	36
13. New-style Langstroth Hive.....	37
14. Comb Honey Rack.....	38
15. Prize Honey Box	39
16. Dove-tailed Section.....	39
17. Moore's Honey Box.....	40
18. Case of Prize Boxes for Langstroth Hive.....	40
19. Case of Eight Small Sections for Langstroth Hive...	41
20. Shipping Crate to contain 12 Prize Boxes.....	41
21. Tin Points for Glassing Boxes.....	42
22. Comb Honey Carrier.....	42
23. Foot-Power Saw	43
24. Hand Rip-Saw.....	45
25. Excelsior Honey Extractor	50
26. Strainer to cover Entrance to Honey Gate.....	51
27. Comb Basket of Excelsior Extractor.....	51
28. Scofield Honey Knife.....	52
29. Comb Foundation	53
30. Comb Foundation Machine.....	54
31. Bases and Cross-Sections of Cells	54
32. Carlin's Foundation Cutter	55
33. Grooved Board for Cutting Starters	56
34. Swiss Wax Extractor	57
35. Mandible of Queen, magnified.....	60
36. Valentine's Frame Stand	61
37. Atomizer for Spraying Bees	62

	PAGE.
38. Finished Queen Cell, ceiled over	63
39. A Ripe Queen Cell.....	63
40. Division Board	64
41. Davis' Queen Nursery.....	66
42. Queen Registering Slate.....	67
43. Legs of Italian Worker Bee	70
44. Ovaries of a Fertile Worker.....	71
45. Frame of Transferred Comb	72
46. Wired Sticks, for Transferring	73
47. Transferring Board.....	74
48. Van Deusen Bee-Feeder	76
49. Method of Filling Van Deusen Bee-Feeder.....	76
50. Simplicity Bee Feeder	76
51. Bingham Smoker	77
52. Bee Veil—complete face protection.....	77
53. Alsike Clover	4
54. Scovell Queen Cage.....	78
55. Simplicity Queen Cage.....	79
56. White Clover	10



FIG. 56.—*White Clover.*

NATURAL HISTORY OF THE HONEY BEE.

INTRODUCTION.

Every apiarist should be well informed, not only on the habits, but also on the Natural History of the Honey Bee.

Man's primeval state, no doubt, absolutely demanded honey—therefore to have neglected to produce such a creature as the Honey Bee, so essential to the comfort of man, "for whom all things were made," would have been totally discordant with the well-known principles of universal and Divine benevolence. Could any song of birds in Eden's enchanting bower surpass the mellifluous hum of the busy Bee? Could any sportive gambol, circling flight, sudden dart, or graceful curve of bird on the wing, equal the grace and beauty, the action and the science of her aerial sports or daily duties? Could the combined aroma and symmetrical form of the thousands of "the flowers of Paradise" compare with the sweetness of her honey or the garniture of her store house? Could any portion of "the garden," which Adam was directed to "dress and keep," present greater attraction, or have stronger claims upon his protection and care?

While Honey was "from the beginning" among the first of sweet things, and the sweetest of first things, given by the Creator to man,—sugar is, separated from its source and prepared for use by the hand of man, but of modern birth!—For thousands of years Honey was man's only sweet, and source of nourishment,—but only for a short time has sugar had its partial sway—and that alone in modern times. The former was the creation and gift of God! The latter is the invention of man!

No historian has been able to transmit to our day, a

description of the rude home that Noah provided for the bees that he carried into the ark, nor tell us if Abraham's bees were kept in log-gums or box hives, but it is recorded that the land where Abraham dwelt—Canaan—was one "flowing with milk and honey;" and when the old Patriarch, because of the famine that prevailed there, sent his sons to Egypt to buy corn, he sent as a present to the Egyptian ruler some of Canaan's famous honey.—Gen. 43 : 11.

We may well conclude that Canaan's honey was then as famous as in subsequent ages was the honey from Mount Hymettus, in Greece.

The earliest mention of honey as an article of commerce, is, that the Jews were engaged in trading it at Tyre, that old and honored mart of trade in Phœnicia.—Ezek. 27 : 17.

Sirach, who lived about the time of the re-building of the Temple at Jerusalem, speaking of the necessities of life, mentions honey, with flour and milk.

The Persians, Grecians and Romans, used honey quite extensively as an article of diet ; they also used it largely in *preparing* their food, and by it, most of their beverages were sweetened.

Ancient Sages, among whom were Homer, Herodotus, Cato, Aristotle, Varro, Virgil, Pliny and Columella, composed poems extolling the activity, skill and economy of bees, and in more modern times, among such authors have been Swammerdam, a German naturalist ; Maraldi, an Italian mathematician ; Schirach, a Saxon priest ; Réaumur, inventor of a themometer ; Bonnet, a Swiss entomologist ; Dr. John Hunter ; and Francis Huber, who, though totally blind, was noted for his many minute observations, by the aid of his assistant, Burnens, which caused quite a revolution in ancient theories concerning the Honey Bee. He was also assisted by Mdle. Jurine, who, by delicate microscopic examinations, rendered important service not only to Huber, but also to future generations.

But space forbids us to enumerate all the apiarists of the present age—prominent among whom we may mention Dzierzon, Von Berlepsch, Leuckart, Von Siebold, Sir John Lubbock, the Rev. L. L. Langstroth, Samuel Wagner, M. Quinby, Adam Grimm, J. S. Harbison, Capt. J. E. Hether-

ington, Professor A. J. Cook, and a mighty host of others, who, through faith in scientific research and devotion to experiments and manipulations, have wrought wonders with their Bees. "Pulling down the strong-holds" of old-fogy opposition, they "waxed valiant in fight" against all forms of ignorant and fossilized theories, consigning them to a burial with the fallacies of past ages—and, as if by magic wand, they have bidden modern ideas and scientific management of the Apiary to "*arise and shine*," sending its benign influences to the very ends of the earth!

THE RACES OF BEES.

Of the different races of the Honey Bee, the German or black bee is the most numerous, though it is not older than the Italians, which were known to the ancients several hundred years before the Christian era, and are mentioned by Aristotle and Virgil. The Egyptian, Carniolan, Cyprian and Javan bees are but little known in this country. The Italian being the favorite because of its docility, activity and captivating beauty.

A COLONY OF BEES.

In its usual working condition, a colony of bees presents a scene of the most lively interest, not only to the naturalist, but also to every curious observer. Such a colony will contain a fertile Queen, thirty to forty thousand of workers, and in some seasons, a few hundreds of drones.

THE QUEEN.

The Mother Bee, as she is called in many countries, especially in Italy, is the only perfect female in the Colony, and is the mother of it. Her only duty is to lay the eggs for the propagation of the species. She is a little larger around the body than the Worker, but not as large as the Drone.—Her body is longer than the Worker, but her wings are only about two-thirds of the length of the body, her abdomen gradually tapering to a point. She has a sting, but uses it only upon royalty.

The Queen usually leaves the hive only when accompanying a swarm, and when a few days old, to meet the drones,

for the purpose of becoming fertile. Once becoming such she is so for life, though she often lives three or four years. On her return to the hive, after meeting the Drones, if she has been fecundated, the male organs may be seen attached



FIG. 1.—*The Queen Bee, magnified.*

to her abdomen. In about two days after thus mating with the Drone she will commence to lay eggs, and she is capable of laying two thousand, or more, eggs per day.

Instinct teaches the Workers the necessity of having a Queen that is prolific, and should she become barren from



FIG. 2.—*Head of Queen, magnified.*

any cause, or be lost, they immediately prepare to raise another to take her place. This they do by building Queen cells, and if, when these are about one-half completed, the Queen has not deposited eggs in any of them, they take

eggs from worker cells and supply them. By feeding the embryo Queen with royal jelly, the egg that would have produced a Worker, had it remained in a Worker cell, becomes a Queen.

The Ovaries of the Queen, occupying a large portion of the abdomen, will be found to be two pear-shaped bodies, composed of 160 to 180 minute tubes, the tubes being bound together by enveloping air vessels. These are the ovaries, of which a highly magnified view is here given.



FIG. 3.—*The Ovaries of the Queen.*

The germs of the eggs originate in the upper ends of the tubes which compose the ovary, and the eggs develop in their onward passage, so that at the time of the busy laying season, each one of the tubes will contain, at its lower end, one or more mature eggs, with several others in a less developed state following them. These tubes terminate on each side in the oviduct, through which the egg passes into the vagina; and, in the cut, an egg will be seen in the oviduct, on the right. (Fig. 3). A globular sac will be noted, attached to the main oviduct by a short, tubular stem.

A French naturalist, M. Audouin, first discovered the true

character of this sac as the spermatheca, which contains the male semen; and Prof. Leuckart computes its size as sufficient to contain, probably, twenty-five millions of seminal filaments. It seems hardly possible that so large a number should ever be found in the spermatheca, as it would require nearly twenty years to exhaust the supply, if the queen should lay daily 2000 eggs, 365 days in the year, and each egg be impregnated. Each egg which receives one of the seminal filaments in passing, will produce a worker or queen, while an unimpregnated egg will produce only a drone. The spermatheca of an unfecundated queen contains only a transparent liquid with no seminal filaments, and the eggs of such a queen produce only drones.

The Queen usually lays from February to October, but early in the spring she lays sparingly. When fruit and flowers bloom, and the bees are getting honey and pollen, she lays more rapidly.

THE DRONES.

These are non-producers, and live on the toil and industry of others. They are the males, and have no sting—neither



FIG. 4.—*The Drone Bee, magnified.*

have they any means of gathering honey or secreting wax, or doing any work that is even necessary to their own support, or the common good of the colony.

The Drones are shorter, thicker and more bulky than the Queen, and their wings reach the entire length of their body. They are much larger and clumsier than the Workers, and are covered with a short but fine hair. Their

buzzing when on the wing is much louder and differs from the others. Their only use is to serve the Queen when on her "bridal trip."

Not more than one in a thousand is ever privileged to perform that duty, but as the Queen's life is very valuable, and the dangers surrounding her flight are numerous, it is necessary to have a sufficient number of them, in order that her absence from the hive may not be protracted. After mating, she returns to the hive a fertile Queen for life.

The Drone in the act of copulation loses his life, dying instantly. At the approach of the swarming season they are



FIG. 5.—*Head of Drone, magnified.*

reared to fertilize the young Queens; after that is accomplished, they are mercilessly destroyed by the Workers.

Should a colony lose its Queen, the Drones will be retained later; instinct teaching them that without the Drone, the young Queen would remain unfertilized, and the colony soon become extinct.

THE WORKERS.

These are undeveloped females, and they do all the work that is done in the hive. They secrete the wax, build the comb, gather the pollen for the young, and honey for all; feed and rear the brood, and fight all the battles necessary to defend the colony.

Of the three kinds of bees, these are the smallest, but constitute the great mass of the population. They possess

the whole ruling power of the colony and regulate its economy.

The workers are provided with a sack or honey-bag; there is a small cavity on their posterior legs, (Fig. 43, A.) in which they store the pollen of flowers in very small lumps, being



FIG. 6.—*The Worker Bee, magnified.*

the most convenient form in which to carry it home. They are also provided with a sting, which they use only for defense.

They gather honey, which is a secretion in many flowers—pollen, which is the farina of various plants, and which is largely used in forming bee-bread, and also propolis or bee-



FIG. 7.—*Head of Worker, magnified.*

glue, a resinous substance that is used in fastening the combs to the sides of hives, and to fill cracks or open places.

Many persons entertain the idea that the Worker bees live many years. Their conclusion is drawn from the fact that colonies inhabit the same hive for a long period; but the natural life of the Worker honey-bee does not exceed six

months, and from recent experiments it is ascertained that it does not exceed six or eight weeks in the height of the honey season. Those reared in the fall, having little out-door work to perform, will live till the spring. None of them die of



FIG. 8.—*Anterior Leg of Worker, magnified.*

old age, but the majority work themselves to death, and many are killed through other causes.

BROOD.

The egg is laid by the Queen, in the bottom of the cell ; in three days it hatches into a small, white worm, called larva, which being fed by the bees, increases rapidly in size ; when this larva nearly fills the cell, it is closed up by the bees.



FIG. 9.—*Eggs and Brood.*

The time usually taken for this process is eight days for the Worker or Queen, and $9\frac{1}{2}$ days for the Drone.

The Workers will develop from the egg in 21 days ; gathering honey from about 16 days after emerging from the cell. The Drones will hatch in 24 days, and if the weather is propitious they will "fly" in a few days after. The Queens

mature in 16 days, and are able to fly in a few hours after emerging from the cell.

Until the 17th day the workers seem only to be fit for the work of the hive. Before that age they seldom leave the hive—their labors being confined to the building of the comb, nursing the brood, feeding the larvæ, capping brood and honey cells, &c.

PRODUCTION OF WAX AND COMB.

This subject is an intensely interesting study. Before the time of Huber, it was generally supposed that wax was made from bee-bread; but Huber fully demonstrated that bees could construct comb from honey, without the aid of bee-bread. But, oxygen, being the support of animal heat, *is essential* to bees while building comb, because an extraordinary amount of heat must be generated, to enable them to soften the wax and mould it into such delicate forms.

We herewith present a cut of the under surface of the Bee, showing the wax formation between the segments :



FIG. 10.—*Under surface of Worker, showing Wax in Segments.*

Dr. Dönhoff states that in new comb the thickness of the sides of the cells is but the 180th part of an inch! Such delicate work is hardly conceivable; and yet, bees often make it in the dark, on cool, cloudy days, or in the night—appearing never to rest.

Prof. Duncan, professor of Geology in King's College,

London, in his work on the "Transformation of Insects," remarks as follows on this interesting subject :

"The production of wax is one of the most remarkable physiological phenomena of the organization of these *Hymenoptera*. It was generally thought, formerly, that the bees disgorged their wax from the mouth, and Réaumur certainly held this opinion ; but John Hunter discovered the manner in which the wax was formed ; and it is now evident that the bees carry within themselves this important building material. The segments of the abdomen of bees overlap from before backwards, but when the margin of one is lifted up, two broad and smooth surfaces will be noticed on the uncovered surface of the next wing ; these surfaces maintain during one part of the year two thin, white, and almost transparent laminæ, which are really composed of wax. The wax is really secreted by some small glands which are within the abdomen, and it transludes through the soft and smooth integument between the rings or segments. It would appear that the sugary matters which are sucked and digested by the bees are to a great extent transformed into wax, which is to all intents and purposes a sort of fat."

A writer in *Scribner's Monthly* thus describes the manner of comb building in a new swarm :

"When a swarm of bees is about to leave its old home and seek another, each bee fills itself with honey. After entering their new home, the gorged bees suspend themselves in festoons, hanging from the top of the hive. They hang motionless for about 24 hours. During this time the honey has been digested and converted into a peculiar animal oil, which collects itself in scales or laminæ beneath the abdominal rings. This is the wax. One of the workers, called the founder, then draws from its own body, by means of its clawed foot, a scale of wax. This it breaks down and crumbles, and works with its mouth and mandibles till it becomes pliable, and it then issues from the mouth in the form of a long, narrow ribbon, made white and soft by an admixture of saliva from the tongue. Meanwhile the other bees are making ready their material in the same way. On the ceiling of the hive an inverted, solid arch of wax is built, and from this the first foundation cells are excavated, all the subse-

quent ones being built up and around these, which are usually three in number. The size and shape of the cell is determined by its future use; but all comb is formed of two sheets of cells placed back to back, the partition walls of the two sheets always alternating with one another. If the comb is intended for brood, 25 cells of worker-brood, and 16 of drone, go to the square inch."

Neighbour, in his work on "The Apiary," says:

"Wax is the animal fat of the bees, and to produce it requires a considerable consumption of honey, to supply the drain upon the system. To be capable of passing through the pores of the abdomen, the wax must, no doubt, be a liquid, oily matter, which, on making its appearance outside the abdominal rings, thickens, and exudes from under the 4 medial ones, in flakes like fish-scales, one on each side; so that there are 8 of these secreting cavities, which are peculiar to the worker, not being found either in the queen or drone.

"The rapidity with which comb-building progresses would lead to the supposition that there is a division of labor among bees, just as laborers convey building material to the artisans on the scaffold above. This work of comb-building is carried forward in warm weather, for a cold temperature interferes with the secretion of wax. Von Berlepsch declares that he has known cases in which a colony has built 300 square inches of comb in a single night!"

The Rev. L. L. Langstroth remarks as follows:

"It is an interesting fact, which seems hitherto to have escaped notice, that honey-gathering and comb-building go on simultaneously; so that when one stops, the other ceases also. As soon as the honey-harvest begins to fail, so that consumption is in advance of production, the bees cease to build new comb, even although large portions of their hives are unfilled. When honey no longer abounds in the fields, it is wisely ordered that they should not consume in comb-building, the treasures which may be needed for winter use. What safer rule could have been given them?"

With all our ingenuity and skill, we have been entirely unable to equal the bees as builders. Only fancy what delicate work it takes to produce comb, the 180th part of an

inch thick!! True, we take the wax they produce, melt it up, spread it into sheets, and then configurate it, showing the base or foundation of the cells—but there our inventive genius, for the present at least, “takes a rest.” In comparison with their workmanship, ours is as a thick sheet of wrapping paper to a delicate sheet of tissue paper!

It is estimated that it takes about 20 pounds of honey to produce one pound of wax; it is therefore all-important that all good pieces of comb should be preserved and given again to the bees.

There are three kinds of cells in a hive. The smaller ones are hexagonal, and a little more than one-fifth of an inch in diameter, and are called Worker cells; the larger ones of the same shape are one-fourth of an inch in diameter, and are



FIG. 11.—*Frame of Brood.*

called Drone cells. These cells may be seen illustrated in Fig. 11. The smaller or Worker cells being shown at the top; the larger or Drone cells, at the bottom. The other cells, of different size and shape, (see Fig. 11.) are Queen cells; one is shown in the centre of the engraving, and four more on the left. They extend vertically or diagonally downwards, and very much resemble a peanut in form and size—they are simply the birth-place of Queens, and are

only built in swarming time, or when the colony is rearing a Queen. The Worker or Drone cells are used not only for brood-rearing, but also for storing honey and pollen, or bee-bread.

At first when the combs are built, they are generally transparently white, but with age and use for brood-rearing they become dark and opaque. The thin cocoons lining the cells, help to make them so; such are, however, just as valuable for breeding purposes for a long time, or until the size is materially diminished, thereby causing dwarfed brood. It is also valuable for storing honey, where the Extractor is used.

POLLEN OR BEE BREAD.

This is the fertilizing dust, or fine meal-like substance, which the bees procure from the stamens of flowers. When deprived of bloom, they will take flour in lieu thereof. Bees collect pollen and carry it in their pollen baskets (Fig. 43, A.) to the hive and store it for daily or future use.

When mixed with honey it is used to feed the young; older bees use it also for food, to elaborate wax, &c.

Bees only gather one kind of pollen at a time. While different bees may carry in several colors at the same time, the pellets on any one bee will be all alike.

Bees require water when comb-building and brood-rearing is going on, and should have access to it.

PROPOLIS OR BEE GLUE.

This is also collected, like pollen, by the bees, from resinous buds, and is used for fastening combs, coating uneven surfaces, and filling up cracks within the hive. They also sometimes use it in hermetically sealing up any offensive matter that may be too burdensome for them to remove from their hives.

THE ESTABLISHMENT OF AN APIARY.

SITUATION, STOCKING AND ARRANGEMENT.

An enthusiastic admirer of the elegant habits of Bees, presistently enquires, Did any one ever sufficiently admire—did he, indeed, ever notice—the entire elegance of the habits and pursuits of bees? their extraction of nothing but the quintessence of the flowers; their preference for those that have the finest and least adulterated odor; their avoidance of everything squalid (so unlike flies); their eager ejection or exclusion of it from the hive, as the instance of carcasses of intruders, which, if they cannot drag away, they cover up and entomb; their love of clean, quiet, and delicate neighborhoods—thymy places with brooks; their singularly clean arrangement of so liquid and adhesive a thing as honey, from which they issue forth to their work as if they had nothing to do with it; their combination with honey-making, of the elegant manufacture of wax, of which they make their apartments; their orderly policy; their delight in sunshine; their apparent indifference to anything regarding themselves, apart from the common good?

BEE-KEEPING A SCIENCE.

To succeed in any calling, we must first gain a reasonable amount of knowledge of the science upon which are founded the rules of that art. Bee-keeping is a science, having for its object the attainment of a correct knowledge of all that pertains to the habits and instincts of these wonderful insects; and a practical art which regards all the attainments thus made as the only reliable basis of successful bee-culture. Therefore, to make the pursuit both pleasant and profitable we must possess the requisite knowledge of the laws that govern these industrious creatures.

Reading and study as well as experience and observation are essential to obtain this knowledge. The lacking of these things will account for the many failures of those whose enthusiasm is not supported by experimental knowledge!

Every apiarist, therefore, *must* read and study, in order to practice the art with pleasure and profit.

WHO SHOULD KEEP BEES?

Many embark in this occupation who should not; being better adapted to some other. Only those should do so who are fond of the study of nature, particularly of the nature and habits of the honey bee! They must be willing to adopt the valuable improvements of the present day, and keep pace with this progressive age; they must be able to control themselves, in order to control their bees. Such only will succeed—while those who still cling to the brimstone and old foggy notions of their fathers, and who are averse to progressive bee-keeping, who shun the little pets on account of their pungent weapons, and when stung retaliate with more ferocity and less judgment than would become a mere animal—can never succeed, and should avoid bee-culture.

The careless, slovenly and lazy person should not keep bees. The care of an apiary is more than it is usually conceived to be—it is *work*! Work for the brain, as well as the hands and feet!

SUITABLE LOCATION.

As this work is intended principally for beginners and those unacquainted with the business of bee-keeping, we shall not discuss those questions which alone interest the advanced apiarist as to location, &c. We simply say: Get a good location where fruit and flowers abound, and where white clover and linden or basswood is found. Almost anywhere within the United States will be good.

One thing we would say: Don't go where there are already many other bee-keepers, for several reasons: 1st.—If you should have Italians, you don't want to have your queens fertilized by impure drones. 2d. The pasturage may not be sufficient to support more bees. 3d. Older bee-keepers may think you are "treading on their toes," and it may lead to unpleasant feelings, and a disastrous competition.

A territory of three or four miles all alone is quite a luxury, if you intend keeping bees for profit.

Our apiary is located in Chicago, close to one of the main thoroughfares and street-car lines, and the results in both increase of colonies and honey has been exceedingly satisfactory. Mr. Muth, of Cincinnati, has his apiary on the roof of his store—and is successful with it.

We use saw-dust under and around the hives, to prevent the springing up of grass to the annoyance of the bees.—Some use sand or gravel for the same object, with success.

A timber range is very desirable, for a large portion of their honey and pollen they gather from timber and shrubs. Many good localities are found near rivers or streamlets, where linden, sumac, maple, willow, cottonwood, and other trees, shrubs and vines that yield honey and pollen abound.

The bees should be near the house, or where they can be heard when they swarm. They should be so located that the north and west winds would not strike them, where they can have a warm, calm place to alight.

A hedge, high board-fence, or building on the north and west are a protection against the strong winds which destroy very many laboring bees in the spring, when one bee is worth as much as a dozen in the latter part of summer, as they are then much needed to care for the brood and keep it warm.

If, in April, the day has been rather warm and the evening cool and windy, hundreds of bees may be found on the ground in front of the hive, perhaps loaded with pollen, but exhausted from the flight and chilled with cold. As they approach the hive they relax their exertions, and a light whiff of wind dashes them to the ground, from which they are unable to arise, and before the sun could warm them up, the next morning, they will be dead.

If you have no shade for your bees, it would be best to plant fruit trees among them. These would not only supply them with pollen and honey in blooming time, but acceptable shade in hot summer days. Another thing is apparent, *i. e.*, the fruit would be a remuneration. The bees would fructify the trees and make them to bear plentifully—while in return, the trees would afford to the bees that shade which they so much require, from the burning rays of the sun.

WHICH WAY SHOULD HIVES FACE.

There seems to be no facing superior to the one that allows the sun's rays to shine directly into the entrance of a hive at 11:30 a. m. There is not a difference of any consequence between a south, south-east or south-west aspect, and selection may be made to suit the apiarist's notion. Next to this, we should say, face to the east; if this is impossible, then west—and when no other is available, submit to a north frontage.

WHEN TO COMMENCE.

The reason why many are unsuccessful is that they commence at the wrong TIME. It may have been noticed that about every third year has been a poor season for bees. After such a season but few will commence; while, if the next is a good one, many think the matter worthy of their attention, and if this is followed by another prosperous year, they then decide to embark. But alas, that is just the time to meet the third year's reverse. Those, therefore, who engage in the business should not be discouraged at one reverse.

Early in the spring is the best time to begin—and thus secure an increase of bees as well as honey the first year.

HOW MANY COLONIES TO BEGIN WITH.

Purchase a colony from some reliable breeder or dealer, and in order to get experience, increase from one or two colonies—not more.

As it is essential to know WHAT to do, WHEN to do it, and HOW to do it, we cannot too strongly advise the beginner to purchase a good manual of the apiary, and STUDY IT WELL. This is absolutely essential to success.

REMOVING BEES.

After procuring the bees and selecting the location and position in the apiary, the next thing is to know when and how to remove the bees. In the spring or fall will be the best time to remove them. In the hot weather the combs may be broken down in transit, and general ruin may be the result.

In September or October they may be removed with safety,

but the best time to begin an apiary is in April or May. Only strong colonies should be purchased, unless nuclei colonies are desired in the spring to build up into strong ones by the fall.

If the distance is less than half a mile, they should be removed late in the fall, or the purchaser may lose heavily by the bees going back to their old location. Only a few days since, we heard of a man buying a few colonies of bees of his neighbor; and, to his surprise, only the young bees, brood and Queen remained, after a few days—the old ones having gone back to their former location, and either died in trying to find their old home or united with other colonies.

It is necessary, however, for their health that shortly after completing their journey they should have one or two fine days on which they can go out and relieve themselves. The disturbance created by transport causes every bee to fill itself with honey, and the condition thereby induced is unfavorable to lengthened confinement. We can always calculate on a fine day occurring after a short interval, in the fall—but one suitable for bee flight may not happen in winter till after the lapse of several weeks. If bees eat freely, and are constrained by an inclement atmosphere to remain long within their hives, evil consequences follow. This is what sometimes causes destruction to colonies moved in winter.

WHAT KIND OF BEES TO GET.

Some prefer to purchase black bees in box hives, and then transfer them to movable frame hives in order to get experience. In that case, they should be populous colonies with the comb yellow or brown. Then the honey received will help to pay for the cost of transferring.

The best satisfaction may be obtained by purchasing strong Italian colonies in the spring. Such will, doubtless, in a few seasons, pay for themselves, thus proving the cheapest in the end, though a little more outlay is required at first. One such colony is worth two of the former.

To examine a BOX HIVE, incline it to one side, looking from the bottom up, between the combs. By using a smoker, the bees may be driven back, and one may discover if it has

capped brood, larvæ and plenty of bees. It should have such to be considered in good condition.

BUYING "SWARMS."

A first swarm is always to be preferred, and if possible from a hive that swarmed the previous year, for then the old queen will be in her second year, vigorous and at her best. A small, second swarm should be passed by, in purchasing. Arrange the frames $1\frac{3}{8}$ inches from centre to centre; tilt the hive forward, at an angle of 20 to 25 degrees, and they will be almost certain to build straight on the comb-guides. If an old hive is purchased, let it be a heavy one in the spring, with straight comb coming entirely down to the bottom of the frames.

HOW TO CARE FOR A FIRST COLONY.

If it comes by express or freight, from a dealer or bee raiser—take it home carefully in a spring wagon. Be sure that the combs run lengthwise of the wagon; drive slowly and handle with care. Place the hive in the position you wish it to occupy, and let it remain till evening, when the wire cloth that is usually nailed over the entrance may be removed, and some board or other obstacle placed in front of the hive, so that when the bees come out in the morning, they will circle around and mark the location, before going to their work, and thus return in due time with safety.—About mid-day, it may be well to open the hive and see whether any combs are broken down, and if so, get them straightened up, and fastened either with twine or wire, until the bees have secured them, when such fastenings should be removed. Be sure to smoke them well, before opening the hive.

BEEES KEPT ON SHARES.

As some may desire to keep bees "on shares"—though we never think it desirable to do so, as it so often leads to misunderstandings and quarrels—we will give the usual "terms" of such contracts:

It is usual for one party to furnish the hives of bees, and the other party the care and labor. The expense of new hives, surplus boxes, comb foundation and queens is usually

divided equally, and at the end of the season the honey and increase of bees are equally divided—leaving each to take all chances of marketing, as well as wintering.

Always make a written contract, stating the agreement in full, and then there will be less liability of a misunderstanding.

BEES MARKING THEIR LOCATION.

This is done through the sense of *sight*. A large percentage of the bees that fly out in the early spring are those that have come into being during the winter and early spring; consequently they do not leave the hive in a straight line, but only go a few inches, then turn their heads towards the hive and oscillate back and forth in front of it; then moving further back, still hovering in front of the hive, with their heads towards the entrance, occasionally advancing towards it, as if to note more particularly the place of entrance and its immediate surroundings, they then increase the distance, taking a survey of buildings, trees, fences, or other noticeable objects near by, after which they return to the hive, and start in a direct line from it. On returning, they come directly to the hive and enter; the surrounding objects and the color of the hive are all noted by the bees.

CHANGING THE LOCATION.

It is desirable not to change the location of hives, unless it becomes absolutely necessary to do so. After the bees have become familiar with their location, should the hive be moved a few feet, they will not notice it when departing on their daily rounds, and if there are other hives near, they may perish in attempting to enter other hives or in wandering about, seeking their own home.

When it becomes necessary to move the hives, it should be done gradually, not exceeding the breadth of the hive each day. Or if they are to be moved several rods, alarm them by smoke blown into the entrance, then close it, and remove, placing some obstacle before the hive previous to opening the entrance again. In moving half a mile or more, the result is different; they note the new locality and return to it.

PREPARATION OF BEES FOR WINTER.

The conditions for out-door wintering with success, are :— Strong colonies, secured by late breeding, 30 pounds of good, capped honey, and vigorous queens. If hives are packed with good, dry, absorbing material, with an air space of two or three inches below them, and an opportunity given for the moisture generated by the bees to gradually pass off, without permitting a draft of air through the hives, there will be no trouble with them, either in winter or spring.

T. B. Miner, an apiarist of considerable experience, says : “When hives are set about a foot apart, upon low stands, they may be protected by driving stakes on both sides of them, (front and rear), and at the ends ; and then fill in compactly all around them with hay or straw, two or three inches thick, with a temporary roof of boards to keep the straw dry. This protection is sufficient for any latitude, however cold it may be, and enables the bees to winter with as little loss generally as occurs under any other system.— The passage-ways to the hives must not be obstructed by the straw, as bees require an occasional flight in mild weather. Another way is to have cheap, outside boxes made, open at both ends, which are to be placed over the hives, and the open space (two or three inches) on each side filled with straw, packed in firmly. A hole in each box, cut out in front of the openings in the hives, having something placed in it to keep the passage-way from being shut up with straw, will afford the bees egress and ingress, when it is safe to allow them to take a flight.”

The requirements to winter bees in cellars are, dryness and darkness, with the thermometer ranging from 35 to 45 degrees ; prolific queens, 30 pounds of good, capped honey, (no glucose, nor uncapped honey that will ferment,) a quilt over the frames to absorb the moisture, and a free passage for air all around and below the hives, to prevent dampness, and a ventilator running to the bottom of the cellar, to carry off the impure air.

Mrs. Harrison remarks very pithily : “The truth in a nut-shell, with regard to wintering bees, appears to be this : Confine the bees to as small a space as they can crowd into, with a plenty of good food, pure air, warmth and dryness.”

If the cellar gets too warm, *cool* it ; if too cold, warm it.—Let them remain until settled warm weather comes in the spring, and thus avoid “dwindling,” by bees flying out and becoming chilled, not being able to return to their hives.

CLIPPING THE QUEEN'S WING.

This is done to prevent her from leaving with a swarm. In attempting to fly she will fall to the ground in front of the hive, and the bees missing her, will return to the hive. This must not be done until after the queen has met the drones, or she will remain unfertile for life. To perform the operation, open the hive and lift the frame carefully, and avoid jars ; when the queen is seen—with a pair of sharp-pointed scissors, lift one of the front wings and cut off about one-half of it. It is better that she be walking, or at least standing, so that a leg be not cut off with the wing. She should not be handled ; if it becomes necessary to pick her up, be sure not to take her by the abdomen. She may be held by the wings without danger.

BEE ENEMIES.

The greatest enemy the bee has is man's “ignorance.” Strong colonies of Italians are proof against the moth, but not against “ignorance” in their keeper.

LUCK OR SCIENCE ? WHICH ?

While some are said to be lucky with bees—others could never have any luck with them. Some will not sell their bees, others will not even give them away ! Still others will neither sell nor give them away, but will allow them to be stolen, if sufficient money be left on the stand to cover their value. Some superstitious ones contend that when a member of the family dies, some one must go and whisper it to the bees or they will do no good afterwards. A host of other whims could be arrayed, belonging to the age of superstition.

A vigorous writer correctly affirms that “practical knowledge is the only secret of success.” Stock-growers tell us if they want to raise good stock they must attend to them, take pleasure in being with them, caring for and administering to their wants. This is precisely the case with bees, and this is the sole secret of success which the ignorant and lazy ascribe to good luck.

WILL BEES INJURE FRUIT ?

Bees never puncture fruit, and unless the skin has been broken by other insects or birds, they never molest it. Any one can easily determine whether bees injure grapes or not. We know it is charged against them by some persons, but if any one will take some grapes and hang them up in the apiary where the bees have full access to them, the matter can be easily demonstrated. This experiment has often been tried, but we have never yet heard of a single instance where the bees have punctured even one grape.

. HONEY BLOOM.

Nearly all the flowering trees and plants of the vegetable kingdom yield honey and pollen.

In earliest spring comes the bloom of myriads of fruit trees, with the maples, poplar, Judas tree, dandelions, willows, &c.

In May we have the white sage, sumac, wistarias, barberry, &c.

During June, the white clover abounds ; also the alsike and melilot clovers, honey-suckle, white sage, motherwort borage, cotton, milk-weeds, mustards, rape, St. John's wort, mignonette, okra, mints, tulips, elders, teasel, raspberries, &c.

July gives us the basswood, figwort, sour-wood bloom, boneset, button-bush, catnip, &c.

While August and September presents us with buckwheat, sunflowers, and myriads of golden rods and fall flowers, generally.

Honey-dew is also a source of considerable honey in some sections of the country.

Every apiarist should acquaint himself with the honey-plants of his locality, and with the time of their coming into bloom. By so doing he may make calculations in advance, and have the bees in condition to take advantage of the honey harvests as they occur.

HIVES AND SURPLUS HONEY RECEPTACLES.

WHAT HIVE TO USE.

Indefatigable industry is the peculiar characteristic of the Bees. During the height of their harvest, they often sally forth even before the rising of the orb of day, and when the short twilight of evening has cast its somber mantle over the face of nature, they may sometimes be seen returning to their homes laden with sweets, which, but for their industry, would be forever lost. Neither the scorching rays of the sun, nor wind, nor storm, will stop them; they avail themselves of every moment that can be employed to advantage, when the fields are decked with flowers containing the precious nectar!

The Creator gave to the Bees no written law, but to guide their labors, He imparted to them instinct to a surprising degree. When the faded bloom and darkened horizon indicate the approach of winter, they look to their hoarded stores for sustenance till the early flowers of spring put in an appearance.

As they provide abundantly, their keeper may reasonably call for the surplus, after supplying their own necessities.—For this he should supply them with a neat and comfortable home, having all the conveniences for storing the precious nectar in convenient and attractive shape. It is, therefore, a matter of some moment to decide what style of hive will best accommodate them as well as their master.

A good hive will give the apiarist complete control of the frames of comb, and afford no harbor for moths. It must give sufficient room for the breeding apartment as well as for surplus honey, and must admit of close scrutiny and easy manipulation. Almost the universal opinion is that the one best adapted to all this is

THE LANGSTROTH HIVE.

Though movable-frame hives were in use in Europe, in rude form, as early as 1795, they were not at all practical until the illustrious German, Dzierzon, invented a hive, in 1848, and our own distinguished and honored Langstroth, in 1852, presented the world with one that has, with his system of management, completely revolutionized bee-keeping everywhere, making it a practical science.

The patent which was issued to the Rev. L. L. Langstroth in 1852 expired in 1873, and there is now no patent either on his hive or frame.

With the movable-frame hive, all the combs can be taken out and replaced, or exchanged with other hives at will, without the least detriment to the bees. The combs having a surplus of honey can be emptied with the Extractor, with-

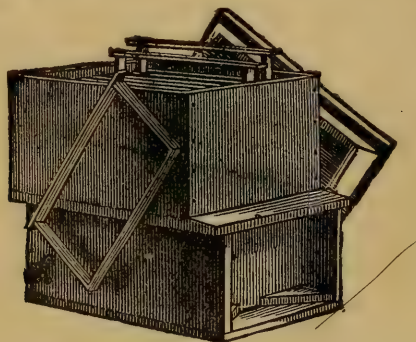


FIG. 12.—*Old-style Langstroth Hive.*

out injury, and returned to the hive to be refilled,—thus saving labor for the bees in making new combs, and honey for their keeper.

The Queen can be found, examined, and, when necessary, can be replaced by one more prolific, or one in some other way more desirable; and artificial colonies can be made at will, as we shall see hereafter. If a colony be weak, it can be strengthened by giving it a frame or two of brood from some other hive. In fact, the movable frame makes the bee-keeper "the master of the situation."

Hives without movable frames, in some form, are far behind the times, and no scientific bee-keeper would for a

moment consent to use them. Drawers, moth traps, nails or blocks to keep frames apart, stops to keep them from slipping, &c., are generally useless. Nearly everything about a hive that is valuable is now public property. Proper management of the bees, however, has much more to do with good results than any form of hive or size of frame.

The Langstroth frame is now very generally used all over the United States, and we must say we much prefer it, and believe it will ere long supplant all others. The beginner, therefore, can do no better than to adopt it. The old-style Langstroth hive, (Fig. 12,) is now in general use, but from the advantages presented in the new Langstroth Hive with manipulating side, (Fig. 13,) we think it will soon become a universal favorite with those who desire to manipulate their bees with comfort and facility, and secure their honey in the most approved manner.

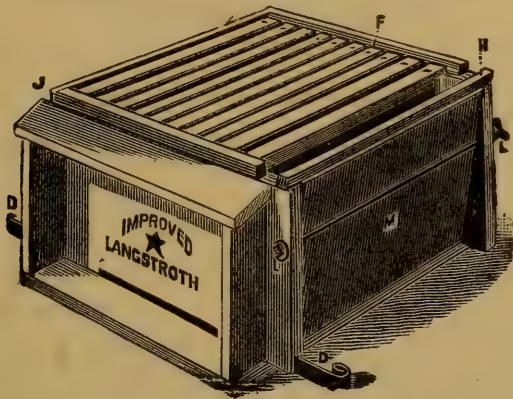


FIG. 13.—*The New Langstroth Hive.*

This improvement on the old Langstroth Hive is exceedingly valuable, as it allows the closest watching of a colony with the greatest ease and comfort. By turning the thumb-screw (L) and opening the movable side (which takes but an instant) the frames can be examined, and by removing the loose side-board (M), the bottom-board may be cleansed—giving all the advantages of a loose bottom-board, without its disadvantages.

This Hive is a combination of the Langstroth Hive and North Star Hive—as patented June 5, 1877, by Sperry &

Chandler, New London, Minn.—and, no doubt, will receive universal approbation as soon as its advantages are known.

The New Langstroth Hive is peculiarly adapted for the production of comb honey—its Honey Rack (Fig. 14) is the best in use, and perfectly adapted to the use of the Prize Boxes. It holds 18 Prize Boxes, with the separators between them, marked B B in the cut. The wedge (A) holds all with a vise-like grasp. The outer boxes are glassed (C C C) as they stand on the hive. By removing the wedge (A) any box may be instantly removed, examined, returned,

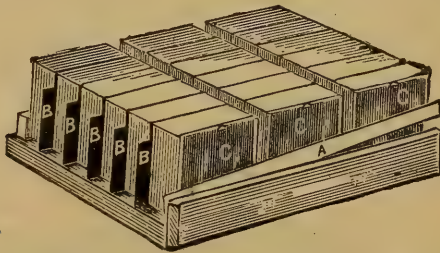


FIG. 14.—*Comb-Honey Rack.*

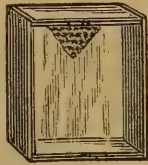
or replaced by an empty one—the spaces between the rows readily admitting the fingers for that purpose.

THE PRODUCTION OF CHOICE HONEY.

In no country on the face of the earth is honey produced, either in ancient or modern times, that can excel or even equal that produced in America. Nature has supplied this vast Continent with honey-sources as varied and plenteous as can be found anywhere in the world. And within the past few years, many improved methods and appliances have been invented for the increased production of honey, as well as to multiply the volume and vastly enrich the quality of this product. Simultaneously with these improvements, we find the consequent increased consumption. Heretofore it was a luxury enjoyed only by a few—but it will, ere long, again take its place among the staple articles in general use. Improvements in the management and culture, as well as increased production, has brought the price down to that which can be afforded by every family.

HOW TO PROCURE THE BEST COMB HONEY.

Not only should we forsake the log-gums and rude straw and box hives of our fathers, and give these busy little workers a neater home with movable frames to contain their combs, but we should teach them to store their surplus honey in small sectional frames and boxes (Figs. 15, 16, 17,) so that it can be easily taken from the hives when full, and marketed in convenient shape, suited to the requirements of retail purchasers.

FIG. 15.—*The Prize Honey Box.*

This box (Fig. 15) is $5\frac{1}{4} \times 6\frac{1}{4}$ inches outside—the sides are $\frac{1}{8}$ of an inch thick and 2 inches wide, while the top and bottom are $\frac{1}{4}$ of an inch thick; and $1\frac{3}{4}$ inches wide, the whole weighing but 2 ounces. It is the favorite box for marketing comb honey, and is made so that it can be glassed or not, as may be demanded by the market. Honey in this box was awarded the Thurber Gold Medal, in New York, October, 1877, by the National Bee-Keepers' Convention, then in session at Cooper's Institute; and honey in this box everywhere commands the highest market prices.

The top and bottom being narrower allows room for the glass, and when put on the hive, the space being then doubled by two boxes coming together, leaves ample means of ingress and egress for the bees.

FIG. 16.—*Prize Honey Box, not glassed.*

The dove-tailed section (Fig. 16) is made of the same thickness at both top and sides, being about three-sixteenths

of an inch, and being dove-tailed, can be put together without nailing. The objection to them, is that they are much weaker than those nailed; and if it becomes necessary to nail them, there is no economy in their use. They are intended to be used *without* glass.

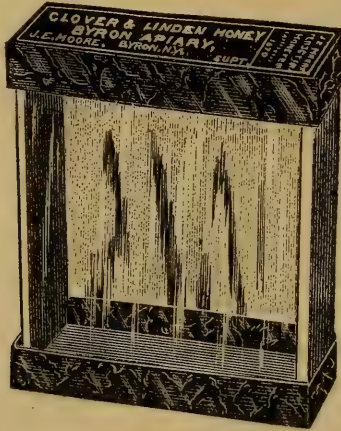


FIG. 17. *Moore's Honey Box.*

This is suited to the same or any other box that it is desired to glass—the two glasses being placed loosely on either side of the box, and then a neat cap, (Fig. 17) being previously glued, is placed ~~on~~ the top and bottom of the section, holding the glass in position, as well as being an excellent protection from leakage when packed together.

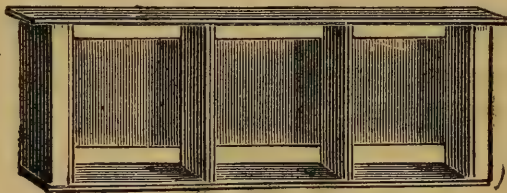


FIG. 18.—*Case of Prize Boxes for Langstroth Hive.*

This case (Fig. 18) is made of $\frac{1}{4}$ inch lumber, 2 inches wide, and holds three Prize Boxes. Such an arrangement must have a seven-inch story made for it, which may be lifted on and off the hive in one piece. It holds 21 Prize Boxes, and is used with success by many. Fig. 18 shows

the tin separators on the back, one of which is attached to every case. This story and cases being a part of the hive—only the boxes are sold with the honey.

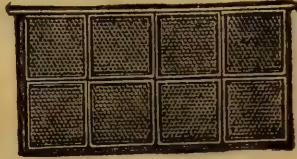


FIG. 19.—*Case of Eight Small Sections.*

This arrangement shows a Case made similar to the above, but of the ordinary size of a Langstroth frame, and holds eight small sections (Fig. 19) with tin separators between them. Such sections are too small to be practical.

These are used, one on each side of the brood chamber, to induce the bees to start surplus storing early. When commenced, if one has a second story of the same size as the breeding apartment, these may be placed in the centre of it to induce the bees to go up there and work.

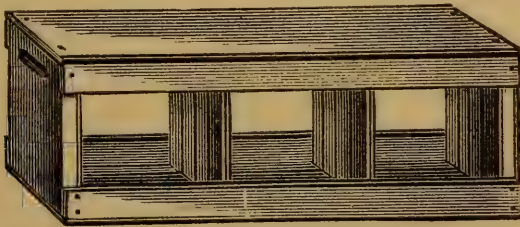


FIG. 20.—*Shipping Crate to contain 12 Prize Boxes.*

The favorite shipping crate is that shown in Fig. 20 ; and honey packed in it is a staple article in cities, especially in the East. It holds one dozen of the before mentioned Prize Boxes or two-pound Sections, (Figs. 15, 16, 17,) and is a very convenient and attractive way of putting comb honey upon the market. Either the "crate" or the "boxes" may be glassed, to protect the honey from the dust of a retail store, and preserve it in its original condition for the consumer's use.

Prize Boxes with a tight top-bar (2 inches wide) are used in the Comb-honey Rack, (Fig. 14) ; those used in Cases

(Fig. 18) have the top and bottom bars only $1\frac{3}{4}$ inches wide—the Case being 2 inches in width, prevents any bees from going above it.

To glass the boxes, two tin points (Fig. 21) should be inserted in the top bar of the section, $\frac{1}{8}$ of an inch from the edge, and the same in the bottom bar. Between these the



FIG. 21.—*Tin Points for Glassing Boxes.*

glass may be inserted, bending down the tin points closely to it; the sides being full 2 inches in width, while the top and bottom are $\frac{1}{8}$ of an inch less on either side—the glass will just make all even, nice and attractive.

The glass may be taken off, at pleasure, by simply straightening up the tin points. Some persons paste paper over the joints, to keep the package air-tight. However desirable the latter may be, the paper is a positive detriment, for it soon becomes covered with fly-specks and dirt, rendering it unattractive to the purchaser.

The above directions are for those used in Cases. (Fig. 18). Those with the tight top-bar, used in the Comb-honey Rack, (Fig. 14) have to be fastened with the tin points at the bottom, as before described, and at the top by having a tin point inserted outside of the glass.

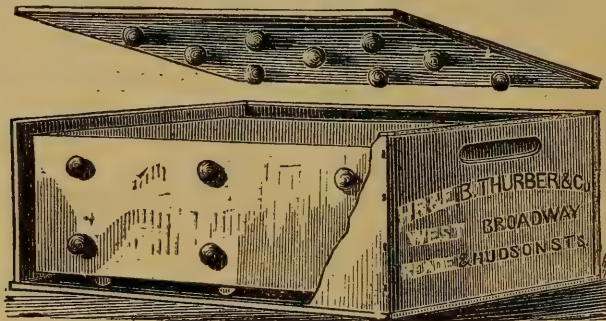


FIG. 22.—*Comb-Honey Carrier.*

This is a very desirable thing for carrying comb-honey (Fig. 22) from the producer to a regular purchaser, and as

they can be returned to the producer free of charge, a few of them will answer every purpose—affording a perfectly safe and cheap way of transporting comb-honey in freight cars.—The difference in expense between “express” and “freight” would soon pay the cost of such carriers, even on a very small crop of honey.

MAKING HIVES AND SURPLUS BOXES.

To save trouble and annoyance in making hives, boxes, &c., it is best to get them cut, and ready to nail together. Should

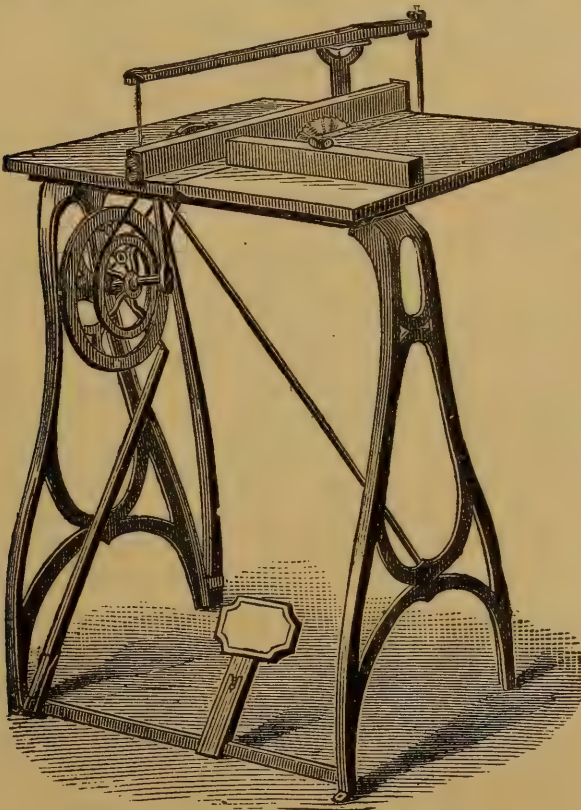


FIG. 23.—*Foot-Power Saw.*

you intend to make them at home, a foot-power saw (Fig. 23) will be very essential in order to saw the material for hives, frames and boxes, so as to exactly fit.

The rapidity and accuracy with which these can be cut out with such a saw is perfectly astonishing, if one has the proper guages and appliances to do it.

Fig. 23 shows the combined circular and scroll saw ; its price being \$40 ; but either the scroll or circular saw alone may be obtained at \$35. These prices include one "rip" and one "cross-cut" saw, 6 inches in diameter ; or 12 scroll saws of assorted sizes—all being supplied, however, with the combined machine. The circular saws reach 2 inches above the table. They can be "set wabbling" on the mandrel, to cut any desired width of groove. Any person who has one of these saws could not be induced to dispose of it. The table is 28x28 inches, and stands 35 inches from the floor.—The circular saw will cut inch pine-boards at the rate of 8 feet a minute, line measure, and will cut either thinner or thicker lumber. We have two of these in use in our manufactory, and have sold several, every one of them giving entire satisfaction.

The Hand Circular Rip Saw (Fig. 24) is of untold value for making hives, and "ripping" out stuff for honey boxes, sections, &c. Its peculiar feature is that the saw, mandrel and balance wheel, slide together on planed ways, similar to a lathe. The saw is easily set to rip any width desired, and for those making their own hives, honey-boxes, &c., it is indispensable. It occupies but little space, and is made of cast steel and iron—only one piece being of wood.

The price is only \$50, and no one who has used one would consent to do without it for many times that sum.

The lumber is placed between two feed rollers, "B. B.," which feed it to the saw. The feed can be made slow or fast as the operator may desire, by the cone pulleys on feed rolls "C. C."

These rollers are self-adjusting to thick, thin, or uneven lumber. The saw can be instantly set to cut any width desired from a board or plank. The machine will feed to the saw, stuff from $\frac{1}{8}$ inch to $3\frac{3}{4}$ inches in thickness, and $\frac{1}{4}$ inch to $19\frac{3}{4}$ inches wide. With it, one man can do the work of three using the old hand-saw. Unskilled operators can do the work rapidly and truly. Unlike the hand saw, the work is square and true as that done by steam or water-power

saws, and as easily dressed with the plane. An operator with ordinary strength and endurance can easily rip, line measure, 600 feet of 1 inch pine, per hour, or 6,000 feet in 10 hours.

By changing the feed to correspond with the thickness or hardness of the lumber, hickory, maple, ash, walnut and cherry can be sawed with ease, the speed cut (line measure)

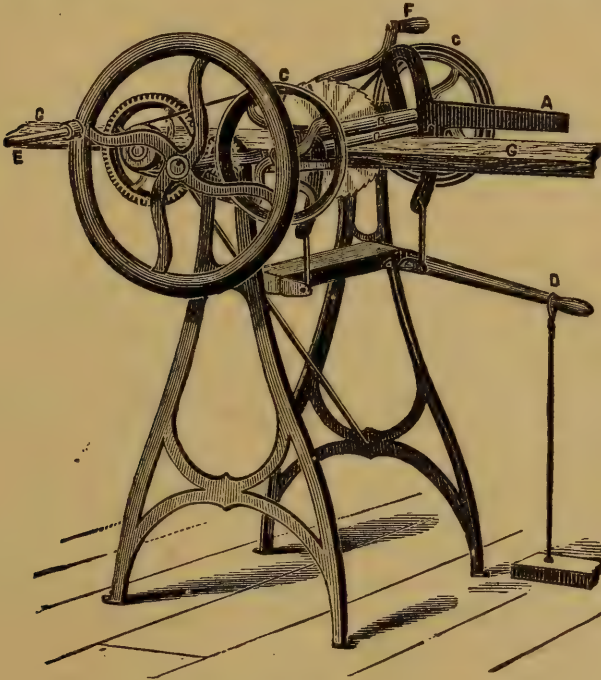


FIG. 24.—*Hand Rip-Saw.*

varying from 150 to 600 feet per hour. These are not rates given that a man can only follow for a few minutes, but actual work, that can be followed up from day to day.

HOW SHALL HONEY BE PLACED UPON THE MARKET?

The marketing of honey is a subject that interests every apiarist. In order that honey may be sold readily, it **MUST BE ATTRACTIVE!** Has it never occurred to the reader to inquire why bolts of muslin are labeled with pictures of luscious fruit? Or why boxes of fancy toilet articles are adorned with lithographs of enchanting faces with bewitching

smiles? Answers to such questions offer us instructive lessons that will pay for the learning! Manufacturers know full well that in order to have their goods sell readily they must be attractive! No matter how good the quality, nor how cheap the price—they must *attract* and *please the eye*!

To-day, comb-honey is *the preference* for table use, and if we would cater to the public want, we must produce that article in the most attractive shape. This must necessarily be arrived at by growth! We could not jump at once to “the most desirable shape,”—but by steady, forward steps, we hope to approximate perfection!

The larger boxes of yore with many combs are rapidly going out of demand, and now it is difficult to dispose of those having more than two combs, at any price. But invention comes to the rescue, putting upon the market single-comb boxes or sections, (Figs. 15, 16, 17) of suitable size and shape to pack in a neat and cheaply-constructed crate, (Fig. 20) containing a dozen combs.

In these boxes G. M. Doolittle sold 10 tons of comb-honey to Thurber & Co., and was awarded the \$50 Gold Medal for “the best honey in the most marketable shape,” at the meeting of the National Convention, in October, 1877. This fact suggested for it the name of the “Prize Box.”

No product of field or farm varies so much in price as honey; and why? Because the *unattractive* manner in which some put it upon the market causes it to be classed as a second or third rate article.

In Thurber & Co.’s price list for Dec., 1877, comb honey, of the best grade, is quoted at 25 cents per pound, in the Prize Box and Crate, while the same honey in three-comb boxes is quoted a 21 cents. These are facts that need no argument.

Tons of honey, in these Boxes, have already been exported to Europe, and we have no doubt but that the demand will increase a hundred-fold! It only requires to be attractively put up, to find ready sale at remunerative prices. If we can meet the requirements of consumers, there will be a demand for all the honey that can be produced on this continent.

As the articles for sauce decrease in the fall, the thrifty house-keeper looks around for something to take its place besides canned fruit. Honey is just the thing she desires;

and it only remains for us to convince the millions of housekeepers of that fact, for the demand to increase and grow to astonishing proportions—if, indeed, the supply be kept up, in good and attractive shape.

One great question, towering far above all others in importance, is: “*How* to dispose of honey to the best advantage.” In vain do we talk of the best hives; the best implements for every department of the apiary.—In vain do we toil and labor from morn till eventide, manipulating our pets and their surroundings.—In vain do we tell of the large amount of honey stored away in our honey houses.—*Vain* is all this, if we cannot dispose of it to advantage and thus *reap the reward* of our well doing!

ASSORT AND GRADE THE HONEY.

All honey should be graded, and a scale of prices be established. Now, one compelled by his needs may sell honey at the very commencement of the season for any price that may be offered, and thus unintentionally break down the market, by giving a start at too low a rate. In this way, individual action is seriously damaging to the *many*, and works in a detrimental way to *all* honey producers. Organization could and should help this state of affairs. Some State Conventions have appointed committees to grade and then dispose of the honey of its members. If this were done in every State or district, we should hear no more of the markets being broken down by premature and forced sales.

HOW TO GET BEES OUT OF HONEY BOXES.

Place the boxes bottom upwards on the cap of the hive from which the boxes were taken, placing an empty box on the top of each one. The bees will go up into the empty box and cluster. They may then be shaken down in front of the hives they belong to.

MANAGEMENT OF COMB HONEY.

“Comb honey in boxes,” says that excellent apiarist, G. M. Doolittle, “should be taken from the hive as soon as it is finished, or as soon thereafter as possible. No apiarist can expect to have his honey sell for the highest market price if

he allows it to stay in the hives for weeks after it has been sealed over, allowing the bees to give the combs a dirty, yellow color, by constantly traveling over it. All box-honey producers know that there always will be cells next to the box that are partly filled with honey, but not sealed over, and when taken from the hive, if the box is turned over sidewise, the honey being thin, will run out, making sticky work. The remedy for this is a small, warm room. Bees evaporate their honey by heat, and therefore, if we expect to keep our honey in good condition for market, we must keep it as the bees do, in such a position that it will grow thicker, instead of thinner all the while. Our honey room is situated on the south side of our shop, and is about 7 ft. square, by 9 ft. high. We have a large window in it, and the whole south side is painted a dark color, to draw the heat. In it the mercury stands from 80° to 90°, while our honey is in it; and when we crate it for market, we can tip our boxes as much as we please, and no honey will drip, neither will any of the combs have a watery appearance—all will be bright, dry and clean.

“But if we keep honey thus warm, the moth will make its appearance, and make it unfit for market, by gnawing off the sealing from our beautiful combs, and also by their sickening appearance in the boxes. We will give the way we manage. We build a platform on either side of our honey room, of scantling, about 16 inches high, and on this we place the boxes, so that the fumes from burning sulphur can enter each box, (the prize boxes pile admirably for this purpose); in about two weeks we fumigate, by burning $\frac{3}{4}$ of a pound of sulphur for every 200 cubic feet in the room. We take coals from the stove and put them in an old kettle, so as not to get anything on fire; pour on the sulphur and push it under the pile of honey, and shut up the room. Watch through the window, and in 15 minutes after the last fly or bee that chances to be in the room has died, open the door and let out the smoke, for if it stands too long, the smoke may settle on the combs and give them a greenish hue. As there may be a few eggs that have not yet hatched, we fumigate again in about 10 days, after which the honey will be free from moths, if you do not let millers into the room.”

THE HONEY EXTRACTOR AND ITS USE.

THE INVENTION OF THE EXTRACTOR.

Following closely after the increased knowledge concerning the natural history of the Honey Bee came improvements in bee hives and modern appliances for obtaining the increased production of honey.

Major Von Hruschka, a retired Austrian officer, who was then keeping bees in Italy, invented the Honey Extractor; and its great value is everywhere admitted by all progressive bee-keepers. The original and complicated machine has been greatly improved in this country—the latest and best machine is illustrated by Fig. 25.

Extracted honey is obtained by the frames being uncapped and placed in the basket or frame-holder of a Honey Extractor, (Fig. 27), which being attached to a single rod in a large can and revolved—the centrifugal force throws out the pure honey from the combs, which runs down the sides of the can and is drawn off and placed in jars or some other desirable receptacle. Extracted honey is the pure liquid—minus the comb.

Many Extractors have been invented, but the latest and best is "The Excelsior," (Fig. 25), and it costs but \$12. The essential points to be obtained, being: one that can be easily taken to pieces and cleaned—one that the shaft holding the revolving basket in position, does *not* revolve in the honey—one that has a strainer (Fig. 26) covering the entrance to the honey gate—one that has sufficient room below the comb basket to allow the honey to remain and ripen before drawing off, leaving it clean and free from sediment, and fit for bottling—one that has an over-motion and strong gearing so essential to ease of operation and effective work—one that has covers to protect the honey from insects—and one that

may be easily handled. Such are all combined in "The Excelsior."

Honey must be "uncapped" before extracting, therefore, a good honey knife is a necessity. Such is the Scofield honey knife (Fig. 28). It is made of the best steel, and is strong at the bend near the handle, and wide enough to allow the cappings to remain on the knife while running across the comb.

WHEN TO USE THE HONEY EXTRACTOR.

Honey can be extracted, if carefully done, without the least injury to the bees or the comb; the latter may be

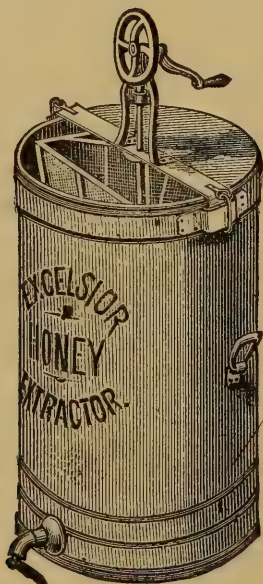


FIG. 25.—*Excelsior Honey Extractor.*

replaced into the hive, and such have often been refilled by the bees within 3 or 4 days.

When the breeding apartment becomes so full of honey that the queen has no room to lay, to extract it is a necessity. By the Extractor, too, all the honey may be taken from partly-filled boxes—a small comb-holder being furnished with each extractor for that purpose, as well as extracting from pieces when transferring. By its judicious use, many

pounds of honey can be obtained that would not be deposited in boxes by the bees.

Empty combs in the spring are invaluable, and in the fall there are usually many surplus brood combs. By extracting the honey from these and carefully putting them away, you not only have the honey for use or sale, but also the much-desired combs in the spring.

Inexperienced bee-keepers are sometimes tempted to extract too closely, and thus ruin the colony. The Extractor should only be used when there is a rapid storing of honey,

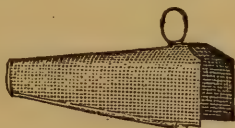


FIG. 26.—*Strainer to cover Entrance to Honey Gate.*

and the outside frames of comb are nearly capped over.—Capped brood will not be injured, but there is danger in using the extractor when the brood is uncapped.

To prevent swarming, the honey extractor is successfully used by some. Its frequent use will usually control it.—



FIG. 27.—*Comb Basket of an Extractor.*

Many swarms and large yields of honey will not be obtained during the same season. The one will be at the expense of the other.

Honey extracted before it is capped is liable to become sour. It needs "ripening;"—if it be "well cured," and placed in a tight vessel, it will keep well.

HOW TO EXTRACT.

With a good "smoker," blow some smoke in at the entrance of the hive ; after awhile, open it and take out the frames of honey you wish to extract from. Shake the bees from each frame by one or two sudden jars, brushing the remaining ones off, right over the frames into the hive, or down in front of the entrance, with a large feather or small turkey-wing.

Place empty combs or a frame furnished with comb foundation in place of those taken from the first hive. A box, or carry-all, with legs and folding covers, capable of holding about 10 frames, and having long projecting handles is very convenient to carry the frames to the operating room. After carefully removing the "cappings" with a long, sharp knife (Fig. 28), from one comb, place it into the comb basket of the extractor, with the uncapped side outwards ; select another of about the same weight, and repeat the operation. A few turns of the crank throws out the honey. Then remove these frames, uncap the other side, and after extract-



FIG. 28.—*Scofield Honey Knife.*

ing the honey from them all as before described, placing them back into the carry-all, take them to the next hive to be extracted ; perform the same operation, using the frames just "extracted" from, to fill the places of those taken from the hive, and repeat the operation till ALL the hives are treated in the same manner that has a surplus of honey.

By this plan, much work is saved, each colony is handled but once, the bees are less disturbed and will resume work much sooner. If desired, the frames from the last hive may be given to the first, after being emptied of the honey, instead of empty frames—if no extra combs are at hand for that purpose.

This is an additional reason why only ONE style of hive should be used in an apiary—so that the frames may ALL be interchangeable. In "dividing" too, it is very essential.

COMB FOUNDATION AND ITS USE.

It is estimated that the workers have to consume about 20 pounds of honey, to be able to construct 1 pound of comb. This being true, 1 pound of comb is equal in value to 20 pounds of honey. If, therefore, honey is worth 15 cents per pound, comb cost \$3 per pound, when produced by the bees. From this we may learn the value of comb foundation when supplied to the bees.

The Comb Foundation (Fig. 29) consists of sheets of wax, obtained by dipping wooden or metal plates into melted wax, and upon being rolled through a machine (Fig. 30), indentations are made on both sides that form the foundation of cells, which the bees readily accept, thin out, and work into comb. These corrugations are made to correspond both with the worker and drone cells—the latter being used for starters in boxes for surplus honey. Fig. 31 shows the rhombs, pyra-



FIG. 29.—*Comb Foundation.*

midal bases and cross-sections of cells. Comb foundation, when held up to the light, shows all these very plainly.

RESULTS OF EXPERIMENTS.

As a result of several experiments, we will note the following: A brood frame being filled with comb foundation in the evening, was examined the next morning, and showed that in 12 hours about half of it had the cells built out sufficient for the queen to lay in them, which she had done. In 24 hours the comb was filled with eggs and the elongation of the cells

was rapidly going on. Within 8 days, 10 combs had been built out, filled with worker brood, and sealed over. Only a very few cells had been filled with honey. The beautiful and regularly-built comb, with its thousands of little inhabitants, was marvelous indeed! To prevent sagging and bulging, it

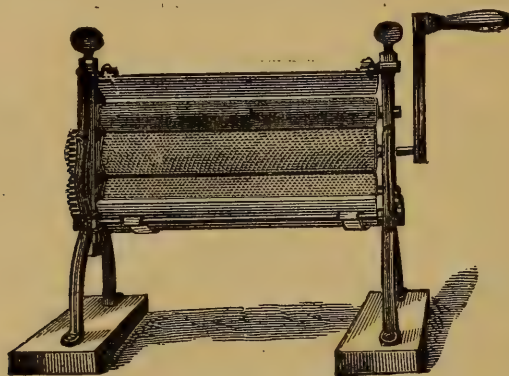


FIG. 30.—*Machine for making Comb Foundation.*

should not touch the bottom or sides; it being better to leave $\frac{1}{2}$ an inch of space on either side and an inch at the bottom.

NEW COMB IS DESIRABLE.

Bees bred in new comb are generally much larger than those raised in old. The cells in the old comb become smaller every year, as every bee that is hatched in them leaves its silky cocoon adhering to the walls of the cell, thus diminish-

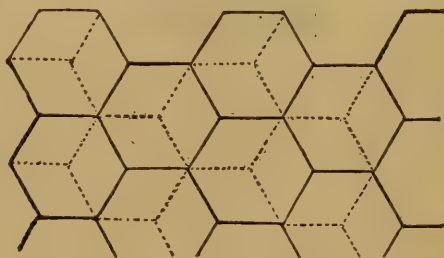


FIG. 31.—*Bases and Cross Sections of Cells.*

ing its size, and, consequently, the size of the bee. When drones are bred in worker-cells (not uncommon), they are stunted in their growth. To raise a queen the cell is enlarged,

and the larva that would, if left in a smaller cell, have been a worker, becomes increased in bulk, and being fed on royal jelly, hatches out a queen—it is safe to say that if an enlarged cell was not necessary to the enlarged size, the bees would not so uniformly require the building of large queen cells.

FASTENING COMB FOUNDATION.

It may be fastened by rubbing the edge HARD against the wood of the top-bar, with some iron instrument, such as a screw-driver, knife, &c.; a little honey will keep the tool from sticking to the wax. Capt. Hetherington uses white milliner's glue for fastening it. R. E. Joiner uses a cement made of equal parts of wax and rosin. After placing the foundation



FIG. 32.—*Carlin's Foundation Cutter.*

in position, top-bar downwards, the cement being melted over a lamp, with a tin teaspoon bent to a small spout, he pours the cement on to the upper corner of the foundation, which running down at the junction where foundation meets the top-bar, sticks it so fast that it would be hard to pull it apart again. Mr. Oatman has a new plan for using comb starters in boxes. The operation he explained to a visitor by "placing the honey box upside-down, then cutting the piece of comb about an eighth of an inch longer than the depth of the box, then running one edge of the comb through the lower part of the blaze of a lighted candle until partly melted. He put this melted edge on the place where he wanted it to stay on the bottom of the box (which, when righted, would be the top), and crowded the other edge into place. It is very quickly and easily done."

HOW TO CUT IT TO DESIRED SIZES.

Carlin's Foundation Cutter is the neatest, cheapest, and best thing we know of, (Fig. 32.) It is simply a revolving wheel of tin, fastened into a convenient handle.

For cutting it into strips of uniform size, for starters in sections and boxes, Novice has suggested a grooved board (Fig. 33), the distance between the grooves corresponding to the width of the strips desired to be cut. For starters in boxes

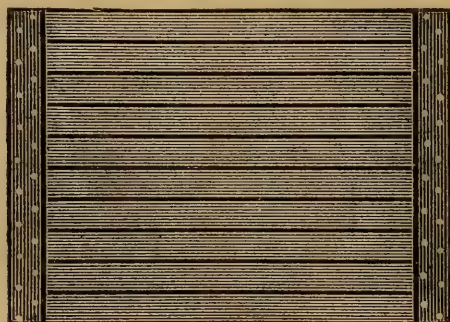


FIG. 33.—*Grooved Board for cutting Starters evenly.*

or sections, it is quite desirable. A strip $\frac{1}{2}$ an inch wide is sufficient, making an excellent guide.

SHOULD FOUNDATION COMB BE THIN OR THICK?

We have just made the following experiment. We placed a piece of thick foundation side by side with a piece of very THIN in a brood frame in one of our colonies. Both were accepted readily, but the thick piece had the cells worked out much deeper in the same length of time. Is it not reasonable to conclude that as THICK foundation supplies the bees with more MATERIAL to build the cells with it is the more desirable for use in the breeding apartment?

COMB FOUNDATION IN SURPLUS BOXES.

As starters of $\frac{1}{2}$ an inch in depth, it is desirable, as it induces the bees to commence operations there much sooner than otherwise. But to put in more than that, will seriously damage the market for comb honey. We have had some honey in prize boxes that contains a regular "fish-bone." Comb foundation was used from one-half to two-thirds of the way down. Our customers frankly tell us they do not want any more of it. We used some of it, and found, to our disgust, that the complaint was well founded. Therefore let us insist that comb foundation be not used for surplus honey, except for starters of about one-half an inch in depth.

Another lot of honey had natural-comb starters of liberal size, and so DARK that it could be distinctly seen through the honey. This is WORSE than the use of comb foundation, for the flavor of the white clover honey was almost destroyed by the old and blackened comb used for starters. If natural comb be used in surplus boxes, it MUST be new and nice. Any other is but a damage to its sale as well as to its flavor.

ARE THE CORRUGATIONS ADVANTAGEOUS ?

The result of an experiment convinces us that they are an advantage. We placed some plain wax sheets in a frame in the brood-chamber by the side of a piece of comb foundation, and the latter was accepted and built out into full cells before the plain wax sheets were disturbed. The bees will use plain sheets of wax, but PREFER the comb foundation.

PRESERVE THE WAX.

The use of comb foundation bids fair to use all the available wax in the country ; every bit of wax and old combs

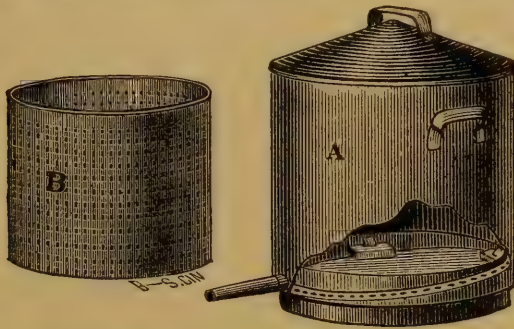


FIG. 34.—*Swiss Wax Extractor.*

should therefore be preserved. By the use of a Wax Extractor (Fig. 34), even the oldest combs can be melted up and reproduced in comb foundation, and be given again to the bees.

A Wax Extractor costs, with a copper-bottomed boiler, only \$5.00, and will not only soon pay for itself, but afford infinite delight to the apiarist. By its use all the old comb may be saved, utilized, and restored to the bees in comb foundation to be worked out into beautiful comb, forming either the cradle of bees or the receptacle of immaculately-pure honey.

FACTS WORTH REMEMBERING.

A "chapter of well-settled facts" was written, we believe, by Mr. M. Metcalf, an apiarist of Michigan. From that chapter we select and endorse the following:

1. All colonies of bees should be kept in strong numbers.—A well garrisoned city may defy assault.

2. A moderate increase of swarms will keep them strong, and secure the largest yield of honey.—As the calves are raised at the cost of butter and cheese, so bees are multiplied at the expense of honey.

3. Bees filled with honey are not inclined to sting.—As the robber's knife is stayed by your purse, so bees are bribed with proffered sweets.

4. In natural swarming, bees fill themselves with honey.—Emigrants to a new country carry their treasures along, as capital to begin with.

5. Bees, alarmed with smoke or otherwise, instinctively seize upon their stores.—The householder, at the cry of fire, secures what he can.

6. There should be no communication between occupied hives, allowing bees of one to pass into the other.—"No house is large enough for two families."

7. A swarm of bees, destitute of a queen, fast dwindles away; and unless supplied with one, soon perishes, either by robbers or moths.—A country without a government, or a farm without an owner, soon becomes ruined.

8. Colonies having combs insufficiently protected by bees, furnish a retreat for millers and food for worms.—Unguarded treasures invite thieves.

9. An excess of drones should be avoided by discouraging the construction of the cells that produce them.—Drones are "dead-heads" of the hive—the useless males in the farmer's herds.

10. The building of drone comb may, to a great extent, be prevented by securing the construction of new combs in hives containing young queens; or by placing frames to be filled, in other hives, near the centre.—"An ounce of prevention is worth a pound of cure."

11. Queens are most economically reared in small colonies.—Who would employ ten men to do what one would do better?

12. Small colonies, if united in the fall, will winter more safely, and consume less honey.—"In union there is strength."

13. Bees of colonies containing fertile and unfertile queens, should not be put together without first "breaking them up;" *i. e.*, inducing them to fill with honey, and destroying the unfertile queen.

14. Natural swarming, always uncertain and perplexing, exposes the bee-keeper to much loss of time and money; while artificial swarming, or more properly, dividing colonies, securing at all times the presence of a worker-laying queen, doing away with all watching and loss by flight to the woods, is both sure and economical.

HOW TO ITALIANIZE AN APIARY.

SUPERIORITY OF ITALIANS.

In 1860 Italian bees were first introduced into this country. The race is undoubtedly superior to the German or black bees—though it is capable of improvement, and we think that the American Italians, as reared in this country, with an eye to “the improvement of the race,” will ere long be not only renowned, but sought after, the world over! In Italy, “the improvement of the race” is unthought of, and many of the queens received from that country are nothing but “scrub” stock, or hybrids!

Briefly stated, the superiority of the Italians is demonstrated by the following:

1. They have longer tongues and can gather honey from flowers where black bees cannot.
2. They are more industrious and persevering, and with the same opportunity will gather much more than black bees.
3. They work earlier and later in the day, as well as in the season, often gathering stores when the blacks are idle.
4. They are better to guard their hives against robbers, and all insects that are enemies to the honey bee, being almost proof against the ravages of the bee moth's larvæ.
5. They are more prolific, and raise their young more rapidly in the spring than the black bees do, and are less liable to breed in the winter.
6. Queens are more readily found, as they adhere more tenaciously to the comb.
7. They are more amiable than the blacks, and it is much easier to manipulate them.

For these and many other reasons we strongly recommend Italianizing.

ITALIANIZING OF THE APIARY.

To do this, a tested Italian queen (Fig. 1) should be obtained from some RELIABLE dealer or breeder, and introduced into one of the best colonies of the apiary. For, as the queen is the mother of the colony, to change queens is to change the whole character of the colony in a short space of time. To successfully

INTRODUCE A QUEEN

it will be necessary to find the queen to be superseded and take her away. A black queen being easily frightened, will hide or run away to some corner, therefore it is best to proceed cautiously and without jarring.

In the middle of the day, when the old bees are at work, open the hive, taking out the centre frame, examine both sides, and if the queen is not there, proceed with the adjacent frames till she is found. If not successful the first time,



FIG. 35.—*Mandible of Queen, greatly magnified.*

close the hive an hour or two, till the bees become quiet, and then repeat the operation. An Italian queen would be easily found, but the blacks are more troublesome. When found, either destroy her or make such other disposition of her as may be desired; cage the Italian queen and insert it between two combs containing honey which the queen may be able to reach at pleasure.

Fig. 36 gives a good illustration of a piece of furniture that will be found very useful in an apiary. It is a stand on which to hang the first frames removed from a hive, when an examination of it is made. It was made by Mr. J. M. Valentine, who describes it so minutely that one can readily make it. Usually the first frames are leaned against the hive, standing upon the ground, and more or less bees are injured. With this "Stand," they are hung up, entirely out of danger.

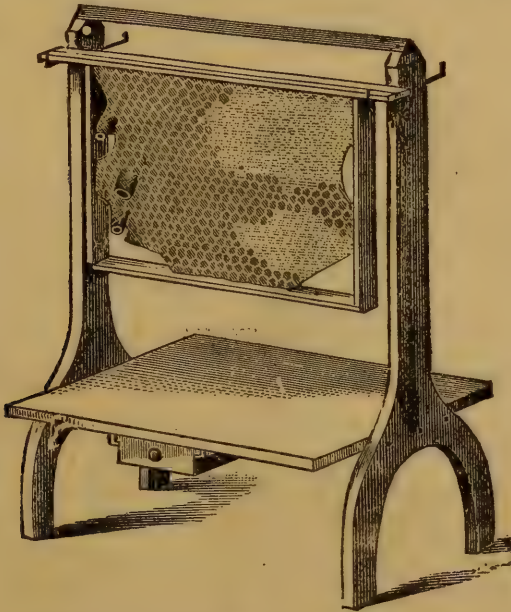


FIG. 36.—*Valentine's Frame Stand.*

"The uprights are $1\frac{1}{2} \times 7$, 24 inches high; a piece 1 inch square runs across the top for a handle to lift it by and to hold the top together. Two inches below the top-bar are hooks on both sides, so as to hang on two frames if desirable. Four inches below the bottom of the frames (when suspended on the hooks) is a shelf 12 inches wide, to which the uprights are nailed. This makes a nice place on which to lay cages, etc. Under this shelf is a drawer 6x8, that draws out on either side, in which I keep a dozen queen cages, a sharp-pointed knife, and a small pair of scissors."

In about 48 hours release the queen upon one of the combs,

and see how she is received. If she is attacked by the bees, molesting her wings and legs, return her to the cage for another 36 hours, after which she will, no doubt, be accepted. Queen cells, if any have been started, should be destroyed.

Another plan, and one that is regularly practiced in our apiary with uniform success, is to make the colony queenless for 24 hours, and then with an Atomizer (Fig. 37) throw a fine spray of peppermint water over both the queen and bees, letting the queen loose upon one of the central combs, and close up the hive. The peppermint water makes the bees

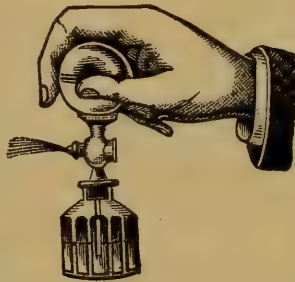


FIG. 37.—Atomizer, for Spraying Bees.

and queen of the same scent, and, almost invariably, she is received with favor. The spray is so FINE, that it is not the least detriment either to the bees, comb, brood or honey.

With a valuable queen, where it is not desired to take the least risk, a new colony may be formed, by taking hatching brood from several hives. Being ALL young bees, the queen will be unmolested. This may be done with perfect safety.

INSERTING A QUEEN CELL.

A ripe queen cell will almost invariably be received with favor by a queenless colony. Of course all other queen cells must be destroyed.

Fig. 38 shows a queen cell finished and sealed, containing an embryo queen. The orifice *a* is capped, and the cell-walls are thickened preparatory to being extended in the direction of the dotted lines *b b*.

When the embryo queen is nearly mature, within 12 to 16 hours of emerging, the bees begin to demolish the exterior compartment (Fig. 38, *b b*), reducing it to a level with the outer edge of the cap of the cell proper (Fig. 38, *a*). The con-

vex cap, being then very prominent, is liable to be injured ; and, to protect it, the bees coat it with a fresh layer of wax, making it nearly as thick as the cell walls. Fig. 39 shows the cell as seen after the anterior compartment has been removed, exhibiting the convex cap *a*.

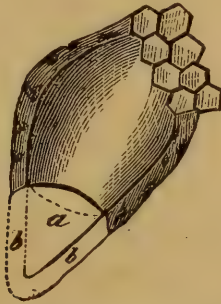


FIG. 38.—*Finished Queen Cell, sealed over.*

The young queen pierces a hole through the edge of the cover (Fig. 39, *a*) with her mandibles (Fig. 35), and then makes a circular cut along its periphery. Being thus detached from the cell walls, the cap drops, opening a circular passage, through which the queen emerges.

To cut a queen cell out, commence on each side of the base of the cell, not nearer than half an inch, and cut upwards a wedge-shaped piece (see Fig. 11), being careful not to squeeze



FIG. 39.—*A Ripe Queen Cell.*

or even to handle the base of the cell. A similar wedge-shaped piece must be cut out of the frame of comb that it is desired to put the cell into. Then carefully place the cell into the hole thus made, fitting it securely in position ; place the frame into the hive and close it up.

NUCLEUS COLONIES.

Nuclei are made by taking two or more frames, as may be desired (at least one of which should contain brood), with adhering bees, and the frame already furnished as above described, with a queen cell, and shaking into the hive bees from one or more frames, so that there may be enough young bees to remain after the old bees have returned to their former hives, to keep the temperature sufficiently high to hatch out the brood as well as to care for the emerging queen. In making up nuclei colonies *be sure not to take away the queen* with any of the frames, else the cell will be destroyed, and all the labor lost.

It is better to use the regular frames for nuclei hives, and either use the ordinary hives with a division board (Fig. 40)

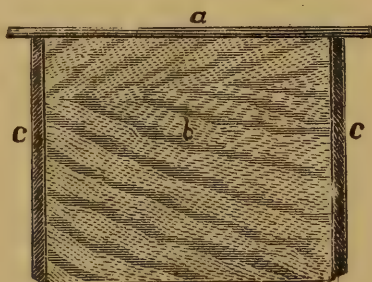


FIG. 40.—*Division Board*

to contract the brood-chamber, and economize the heat, or make small hives just to suit the number of frames used for the nuclei.

Many inquire whether there is any patent on the ordinary division board or not. We say emphatically, *No!* One man has a patent on a division board fitted up with "woolen," or "rubber strips," at the sides, and "lugs," or feet, at the bottom. No one need fear to use the ordinary "division board." A board of *one* piece is neither patented *nor patentable!*

As the virgin queen emerges from the nucleus to meet the drones, sometimes the bees will accompany her if they have no unceiled brood. To prevent this, two or three days after the queens are hatched, insert a frame containing eggs and young larvæ in each nucleus. If the queen should be lost

on her bridal tour, the materials will be on hand for the bees to get another, should the fact be unnoticed by the apiarist.

When the nucleus colonies are formed, set them away in the shade, and in two or three days the queen will be hatched, and a week or ten days later will become fertilized, and be laying; this may be readily discovered upon examination.—Now the apiarist is ready for the formation of new colonies, without the inconvenience of natural swarming, by

DIVIDING THE COLONIES

Bees Swarm because it is their natural manner of increase. By dividing them we secure the increase without swarming, and save time in watching and hiving natural swarms. This, however, must not be overdone. The beginner sometimes imagines that by dividing he can make almost any number of colonies from each one, forgetting that strong colonies are the only ones that accomplish anything. Dividing should never be done unless the colony be very populous and can well spare the bees and comb. To more than *double* the number of colonies each season is not good, unless increase is desired at the expense of honey. Some divide their strong colonies equally, or nearly so, carefully looking for the queen, putting her into the new hive, placing bees and brood in the centre, filling up with frames containing comb-foundation (Fig. 29) removing the hive with the queen to a new location; leaving the queenless hive on the old stand, to rear for itself a queen from the brood it contains. If the queen be a choice one, and it is desired to get queens from her, this is a good plan to get the queen cells started for the nuclei, before described.

But ordinarily we much prefer the nucleus plan of multiplying colonies. Take one of the nucleus hives before described, which should be of the same pattern and size as those to be divided, and remove the division board. Then take a frame containing brood and adhering bees from each colony, placing them into the nucleus until it is full. Be sure not to take the queen away from any hive. The bees that will hatch out in a few days will make that nucleus a populous colony. Put a frame nearly filled with comb foundation (Fig. 29) into each hive from which the frame of brood was taken, and in a few days they will have this all worked out into beautiful comb, and in all probability filled with eggs.

The new colony having a young and fertile queen, and plenty of bees, will soon rival the old one in the vigor of its work. Each of the nuclei can be built up in this way, giving a new colony every few days—or, if the apiary be large, several every day—and thus effectually prevent swarming. Increase being secured in this way, none of the colonies are disturbed, and the bees everywhere “pursue the even tenor of their way.” All being kept strong in numbers they are ready for the honey harvest, and will work in boxes very willingly.

Dividing should be done in the middle of the day, when the bees are busy in the fields and the yield of honey is abundant.

Another plan practiced with success, is to take away the division board in the nucleus hive, fill the frames with comb foundation (Fig. 29), and exchange places with a populous colony, caging the queen of the nucleus for about 36 hours, or until her acquaintance has been made by the strange bees that come pouring into it from the fields—for bees will always return to the exact spot occupied by their home.

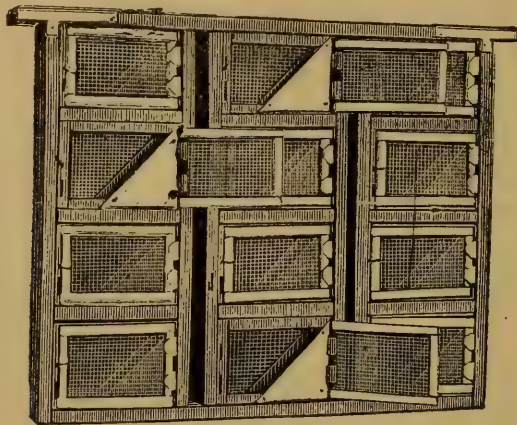


FIG. 41.—*Davis' Queen Nursery.*

To raise queens for the purpose of Italianizing an apiary, the Queen Nursery (Fig. 41), invented by Dr. Jewell Davis, may be used with success. Put into the cages of the nursery, between the tins, a few cells of sealed honey, in new comb if possible. Then cut from the combs of a pure Italian colony as many queen cells, large and well developed, as you have pre-

pared cages with the honey, as above. Suspend one of the cells in each of the cages. Good care should be taken to have the best cells, and not injured by bruising, handling or jarring. Having thus supplied each cage of the nursery with a queen-cell and food—the food is thus supplied that the young queens may not starve if the bees do not feed them, a thing they often fail to do when there is a scarcity of honey in the flowers. The nursery cages so prepared are adjusted in the nursery frame. Then having removed a centre comb from a strong black colony, the queen-nursery may be placed into the vacancy made by the removal of the comb, there to remain until the queens are hatched, which will be in 3 or 4 days, if the cells were not cut from the combs too early, or before the 9th day. When the queens have emerged from the cells, remove the cage and introduce the caged queen to a black colony, liberating her on the next day about sundown—if necessary, spraying the bees with perfumed water by the atomizer (Fig. 37).



FIG. 42.—*Queen-Registering Slate.*

To remember dates every one has not the faculty, and yet all the operations of queen-rearing require that it should be done. For instance, the time when a choice colony was made queenless, to have queen cells started—the time these cells are given to the nuclei—the time of hatching—when the queens commence to lay, &c. To save time and trouble in remembering these and other dates, a small slate (Fig. 42), 3x4 inches, with a hole in the center of the top, should be hung on the hive by a small nail with all these dates written thereon. A printed card tacked on to the inside of the cap is used by some to advantage, in keeping track of such dates.

If the dividing of colonies be neglected, or if it is not desired to practice that method of increase, the bees will become greatly crowded for room, and will necessarily

SWARM.

For some days before swarms issue the bees may be seen clustering at the entrance of their hive, though some come

out where there are little or no indications of a swarm. When honey is abundant, and bees plenty, look for them to come forth at almost any time, from the hours of ten in the morning to three in the afternoon (first swarms), second and third from seven in the morning until four in the afternoon. By examining the hive it can be ascertained whether they are about to swarm or not. If queen cells are seen with eggs or larvæ nearly ready to be ceiled over, a swarm may be expected within one or two days after the first cell is ceiled over, or as soon after as the weather will permit.

After whirling a few minutes in the air, the mass of the bees will cluster on the branch of some convenient tree or bush—generally one that is shaded from the sun's rays.

They should be hived as soon as the cluster is formed, else they may leave for the woods, or if another colony should swarm while the first was clustered, they would probably unite.

Should the queen fail to join the bees, by reason of having one of her wings clipped, or for any other cause, the swarm will return to the hive, as soon as they make that discovery. As the bees are gorged with honey, they may be handled without fear of stings.

"After swarms" being unprofitable, all but one of the queen cells should be destroyed, or cut out, as before described, for nuclei—this will prevent any more swarms issuing. Within eight days the first queen will issue, and finding that she has no rival she will take possession, apparently having no idea of swarming.

To ascertain that she has no rival she makes a peculiar sound—called "piping." If there is another queen in the cell nearly ready to emerge, it will answer by a "piping" sound. If this queen still in the cell is protected by the bees, so that the first queen cannot find and destroy it, she will also prepare to swarm in two or three days. After the departure of this swarm and the emerging of the second queen and her "piping" is also answered by a third queen, a third swarm may also issue.

If the desire to swarm is satisfied after the departure of the first swarm, the queen cells will be all destroyed by the first young queen that emerges.

HOW TO HIVE A SWARM.

If the cluster be low, it is easily performed. The queen is usually in the lower part of the cluster, and by finding "her majesty," and placing her into a hive, which should be placed conveniently near for the purpose of hiving the swarm, and with a dipper, or any other convenient vessel, place the bees down in front of the hive on a sheet, or piece of paper. They will then crawl into the hive, and, finding the queen, be satisfied to remain. When the bees are in, place the hive where it is to remain; a shaded position will be the best. If comb foundation (Fig. 29) be placed into the frames, it will be of very great advantage in comb building.

If they have clustered on a branch or twig, a basket will be quite essential, into which to shake or brush the bees. If on a wall or fence, or on the trunk of a tree, brush them into the basket, and proceed to hive as before described.

A frame of brood and another of honey placed into the new hive will be of much advantage to the bees. The former will prevent the swarm from leaving the hive, and should the queen be lost, it will give them the means of raising another, and the latter will give them a good start. By filling the other frames with comb foundation, (Fig. 29) they will soon be in good condition and perfectly at home in their new quarters.

Sometimes a swarm will make for the woods without clustering—but this is rarely the case.

The beating of tin pans, and all such old-fogy notions, is, of course, of no avail; throwing a stream of water from a fountain pump is often done to bring down an absconding swarm, and cause them to alight and cluster.

THE LOSS OF THE QUEEN.

When the bees manifest a restless and uneasy disposition by running about the front of the hive and signaling each other, it is a sign that they have lost their queen, and they should be examined at once.

Should a colony become queenless from any cause, three weeks may be gained by having an extra queen to give it at once. Upon examination, if no brood is found where the bees are clustering, the colony is queenless. At any time during

the season, from March to October, this is a sure sign. Colonies that lose their queens during the winter have a forlorn appearance. The bees walk around the entrance listlessly and without eagerness; but few of them go in search of either honey or pollen.

No time should be lost in giving a queenless colony a comb of eggs or young larvæ, or both, from which to raise a queen.



FIG. 43.—*Legs of an Italian Worker Bee.*

Sometimes such a colony will refuse to raise queen cells: it may be too weak; its queen may be too old to lay, or they may have a fertile worker. If it be too weak, it should be united with another colony. If its queen be old, she should be removed and the bees given a frame of brood from a prosperous colony. If it has a fertile worker the most effective way to get rid of it is to break up the colony, dividing it among strong colonies having fertile queens.

Fig. 43 shows the legs of a worker bee. The two at the left showing the outside; while the two at the right exhibit the appearance of the inside of the legs, *i. e.*, that part nearest the body. Those at the top of the engraving are the anterior, and the lower ones are the posterior legs; the latter showing the "pollen baskets" at A, A.

WHAT ARE FERTILE WORKERS?

Worker bees being undeveloped females, it is not strange that now and then one may be sufficiently developed to lay eggs. Some account for this by the possibility that the larva



FIG. 44.—*The Ovaries of a Fertile Worker.*

may have been adjacent to the queen cell and received some of the royal pabulum, given so plentifully to the queen.

Prof. Leuckart remarks that "it results entirely from the development of egg-germs and eggs in the individual ovarian tubes—which proceeds precisely in the manner described in the case of the queen." As they are incapable of meeting the drones and becoming fully fertilized, their eggs will only produce drones. Fig. 44 presents a view of the genitalia of such a bee. It differs from the queen merely in the more advanced development of the ovaries. (Fig. 43, A A). Fertile workers deposit the eggs in a very irregular manner, caused by the tubes being very imperfectly furnished with eggs.

TRANSFERRING BEES.

June is the month of swarming in the Northern States, while in the Middle and Southern States the early and abundant bloom signal its advent. The best time to transfer bees from the common to movable-frame hives is about the season of swarming, though it may be done on any warm afternoon, when the bees are actively at work.

A transferring board (Fig. 47), about the size of the frame, should be prepared in advance, by making grooves of about one-half an inch wide and one-fourth of an inch deep, and about 2 inches apart. The spaces between these grooves should be cushioned with several thicknesses of cloth, to prevent the brood from being injured when the comb is laid upon it.

Transferring sticks (Fig. 46) should be prepared from some light, tough wood, about one-half inch longer than the frames

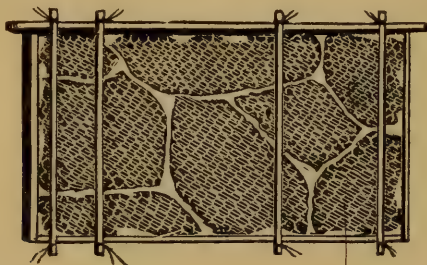


FIG. 45.—*Frame of Transferred Comb.*

are deep, and about one-fourth of an inch square. Fasten two of these sticks together with a piece of fine annealed wire, so as to leave about one inch of space between them, (Fig. 46); attach a piece of wire to the other end of one of the sticks, (Fig. 46, *b.*) to be used in fastening when placed around the frame of comb. (Fig. 45.) A small notch should be cut to admit the wire, and prevent slipping.—These sticks should be made in pairs, and be kept ready for use.

TRANSFERRING FROM A BOX-HIVE.

After smoking the bees at the entrance of a box-hive, remove it some distance from the old stand, leaving an empty hive or box in its place, to receive the bees that

return from the fields ; invert the hive, place an empty box or hive over it, of the same size and shape, wrapping a sheet or cloth around where they come together, leaving no cracks large enough for a bee to escape. By gently tapping the hive for some time, most of the bees, with the queen, will enter the upper box. When they have nearly all left the hive, place the upper box with the bees on the old stand.—Being alarmed and filled with honey, they may be handled without fear.

The old hive may now be removed to a convenient room or building, and taken to pieces, by cutting off the nails with a cold chisel and prying off the ends, cutting the combs when taken out as near as possible to the size of the frames to be used. The transferring board (Fig. 47) should be placed upon a table or box, to be in a convenient position for working over it.

The pieces of combs containing honey may be placed at one side till some with brood are found ; this should be put upon the transferring board (Fig. 47), so that when the frame

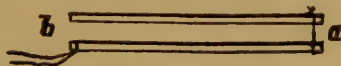


FIG. 46.—*Wired Sticks for Transferring.*

is placed in position over it, the brood may be nearly in the same position as it occupied in the old hive and near the top of the frame, as that will be the warmest position in the hive. With a honey knife (Fig. 28) cut these combs to make them fit. If more are wanted to fill the frame, use the combs of honey first removed from the hive. Then push the ends of the sticks, (Fig. 46, *b*,) that have no wire attached, through the grooves, from the bottom of the frames, where the combs may need support ; the other sticks attached, place on the top of the comb, and fasten the ends together at the top of the frame, as seen in Fig. 45, to match the fastenings below. Place this frame in the hive, and proceed in the same manner with the next brood comb, and let it occupy the adjoining position in the hive, giving the frames containing honey the outside position on either side. The honey from pieces of comb not used, and especially from all drone comb, should be removed with the Extractor (Fig. 25).

Carry the new hive to the old stand, and empty the bees out of the box on a sheet, in front of the hive. See that the queen, as well as all the bees, enter it. To prevent robbing, the entrance should be contracted; and in two or three days, when the bees have fastened the combs, the transferring sticks should be removed. Always work slowly with the bees, and avoid jarring.

TRANSFERRING FROM A MOVABLE-FRAME HIVE.

When it is desired simply to transfer from one style of frame to another, smoke the bees well, and after finding the queen and putting her in a tumbler or some secure place, take a frame, and shake or brush the bees off into the new hive; place the frame upon the transferring board (Fig. 47) and cut out the comb; place the new frame over it and cut

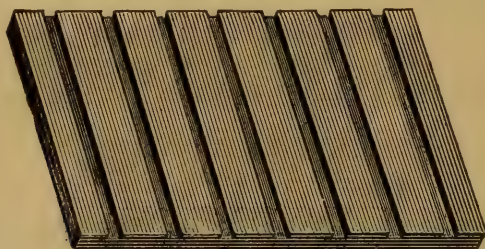


FIG. 47.—*Transferring Board.*

to suit that frame, in the best way possible. Then fasten as before described with wired sticks, (Fig. 46); after thus transferring all the combs, proceed to hive the bees as above directed, letting the queen loose upon one of the brood combs as soon as they are transferred.

UNITING WEAK COLONIES.

Weak colonies may be united after smoking them well, by removing the combs with adhering bees and placing them together in one hive, spraying them with peppermint water by an atomizer (Fig. 38), to give them all the same scent. Give them ventilation and close the entrance till sunset, placing them where the stronger of the two colonies stood. Swarms issuing the same day can be united peaceably.

MANAGING AND QUIETING BEES.

ROBBER BEES.

If all the colonies are kept strong there is no danger of robbing. It is only the weak ones that are robbed. Working with bees at unseasonable times, leaving honey exposed in the apiary, &c., induces robbing. Black colonies and nuclei are usually the sufferers. Contracting the entrance, so that but a single bee can pass, is usually a cure for robbing. In times of scarcity of honey, the apiarist should be careful not to keep a hive open long, or robbing may be the result. All strong colonies maintain sentinels at the entrance in times of scarcity. Those of that colony are allowed to pass, but strangers are "arrested on the spot." If a colony is unable to defend itself, close up the entrance with wire cloth and remove it to the cellar, or some other convenient place, for a few days, and when it is returned to the old stand, contract the entrance to allow only one bee to pass at a time. This can be done with ease in the new Langstroth hive (Fig. 13).

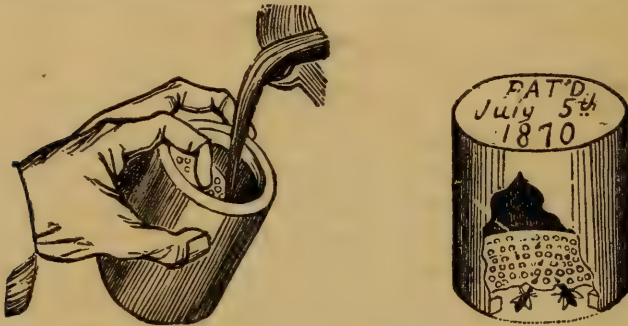
FEEDING BEES.

Feeding early in the spring is advisable to stimulate breeding, and keep the colony strong, so that when the early bloom comes it may be strong enough to gather the delicious nectar. Whenever there is any necessity for it, feeding pays; especially in the fall, before preparing for winter, if their stores are insufficient, feed them; each colony should have at least 30 pounds of good capped honey.

Extracted honey, or coffee A sugar, reduced to the consistency of honey, is best for feeding, in the absence of good sealed honey. The poorer grades of sugar and glucose are totally unfit for feeding bees. To stimulate in the spring one-half of a pound per day is all-sufficient for a colony.

For feeding inside the hive, the Dunham feeder is good. It is made of tin, and is of the size of a frame, with perforated bottom, atmospheric pressure controlling the flow of food.

The Van Deusen feeder is also good (Figs. 48 and 49). It consists of a tin can with a perforated cover. An air-tight connection is made between these by means of a strip of rub-



FIGS. 48 and 49.—*Van Deusen Bee Feeders.*

ber. The food is poured into the tin can (Fig. 48), and is inverted and placed over a hole in the top of the hive or directly over the frames, bringing the perforated surface close to the bees (Fig. 49); they can easily remove the food without leaving the cluster. It does not ventilate the hive; it can be used at any season, and is adapted to any hive.

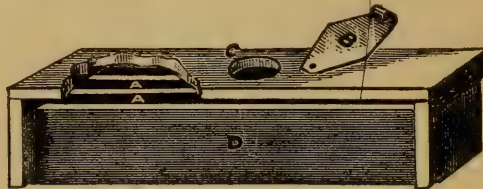


FIG. 50.—*Shuck's Bee Feeder.*

Shuck's Bee Feeder feeds at the front entrance, any time in the day, without danger from robbers, as the food can be reached only from the inside of the hive; it is placed on the alighting board, with the side (D) nearly covering the entrance. In the engraving, the top is cut away to show the wood divisions (A A) in the feed-cup; the food is poured into it without removing, through the hole (C), which is covered with wire-cloth. When done the cap (B) is closed over it, making all tight.

QUIETING AND HANDLING BEES.

Smoke is harmless and is the best thing to alarm and quiet bees. With a good smoker (Fig. 51), blow a little smoke in at the entrance before opening the hive. Give them a little more as you uncover the frames; if very cross repeat the dose, until they yield obedience; then they may be handled with safety. Handle them gently and without fear, avoiding all quick motions; such usually incite them to anger. When honey is being stored rapidly Italians may be handled without smoke; when there is a scarcity it is not safe to do so.

FIG. 51.—*Bingham Smoker.*FIG. 52.—*Bee Veil.*

To those who are commencing, and until familiarity causes the loss of fear, a pair of good gauntlet gloves and a veil are necessary, but after that fear has been overcome, a good veil will be sufficient. Such may be placed over a hat, the bottom of it coming down under the coat or vest, and when thus adjusted it is a complete protection for the neck and face (Fig. 52). It being made of white netting, it does not stain the clothing, and as the piece over the face is black, it can be seen through, nearly as well as if not worn. A good one costs 75 cents, and is a yard long; common black ones, so short as to be undesirable, can be obtained at a less price, but are much dearer in the end.

A pair of gauntlet rubber gloves is best for those who need such protection, while unaccustomed to manipulating bees. The advanced apiarist prefers to have the free use of his hands at all times. Leather gloves are used by some ; such can be obtained for one-half the price of rubber, but they are NOT one-half as good. A friend very pertinently remarks that "bees when gorged with honey are very peaceable ; when often handled they become accustomed to the practice, and when this is gently done, they will scarcely notice the disturbance. By a careful study of their habits and instinct, the practical apiarist may handle his bees with no more fear than the farmer has from the heels of his favorite horse or the milkmaid from her gentle cow."

On being stung, if the poison-bag has not been emptied, remove it with a sharp knife, or better still, with a pair of tweezers so formed as to grasp the sting itself, without press-

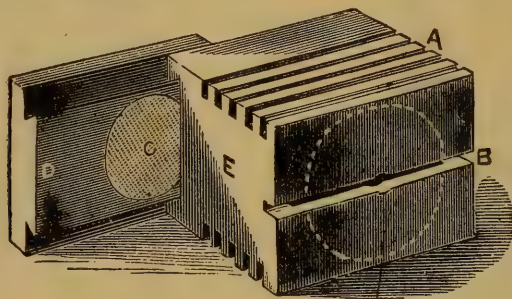


FIG. 54.—*Scovell's Queen Cage.*

ing on the bag. Common hair tweezers are just the thing. This must, however, be done very quickly, or it will be of no use. Grasping the bag and sting with the fingers only squeezes the poison out of the bag and into the wound. After the bag has been removed, suck the wound strongly, and apply a poultice of moist mud.

SHIPPING QUEENS AND COLONIES.

Before colonies are shipped the frames should be secured so that they cannot move. Old combs should be selected for shipping ; and wire cloth nailed over the entrance serves for ventilation as well as to keep the bees in the hive. Of course a strip of wood should be nailed each side, from the cap to the bottom board, to keep the whole safely together.

To ship queens the Scovell Queen Cage (Fig. 54), or the Novice Cage (Fig. 55), should be used. Inclose a few workers with "Her Majesty" as "*compagnons de voyage*." These cages are already provisioned for the journey.

BEE DISEASES.

Dysentery in the latter part of winter and early spring is a malady that affects some apiaries. The bees discharge their excrements over the hives and combs, producing a dark appearance and offensive odor. The cause is either fermented honey, improper food, or too warm and poorly ventilated quarters. Give them good capped honey and a cleansing

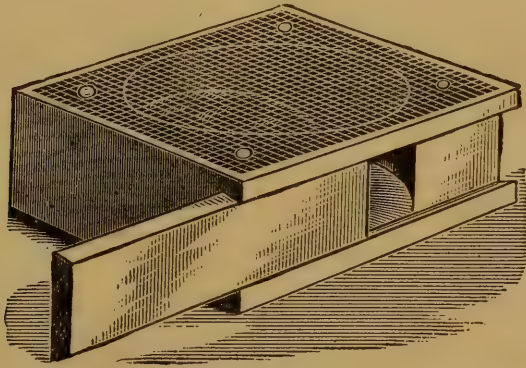


FIG. 55.—*Simplicity Queen Cage.*

flight. If too cold for this, out of doors, take the hive to a warm room, make a box, front and top of wire cloth or mosquito netting, adjust it to the entrance, so the bees must enter it on leaving the hive. This will usually prove an effectual remedy.

Foul brood is the rotting of brood in a hive; the caps of the sealed brood appear indented and shriveled, and the larvæ and young bees in unsealed cells become putrid, emitting a disgusting stench. With an atomizer (Fig. 37) spray the hive, bees, brood, honey and combs with a solution of salicylic acid, borax and rain water, repeated on the sixth day. Remove the diseased brood from the hive and give them good capped honey, and if not too far advanced this may give relief.

INDEX.

	PAGE.
ANCIENT HISTORY of Bees and Honey	12
APIARY, location of.....	26
ARTIFICIAL COLONIES, how made.....	65
BEEES, how to procure.....	28
how many colonies to begin with.....	28
how to get out of honey boxes.....	47
kept on shares.....	30
kinds in each colony.....	13
kinds to purchase.....	29
when to commence keeping.....	28
BEE ENEMIES.....	33
BEE FEEDERS.....	76
BEE GLOVES.....	78
BEE KEEPING a Science.....	25
BEE MOTH.....	48
BEE SMOKERS—the use of.....	77
BEE VEIL, complete face protection.....	77
BEE SWAX EXTRACTOR.....	57
CASES to hold "Prize Boxes".....	40, 41
COLONIES—how to care for first.....	30
now and when may be moved.....	28
should always be strong.....	36
COMB HONEY CARRIER.....	42
COMB BUILDING, and Cells.....	22, 23, 54
new comb always desirable.....	54
how made.....	22
COMB FOUNDATION.....	53
are corrugations advantageous?.....	57
experiments with.....	53
how cut and fastened.....	55
should it be thick or thin?.....	56
how to be used in Surplus Boxes.....	56
COMB FOUNDATION MACHINE.....	54
COMB HONEY, Apparatus to secure.....	38
exporting to Europe.....	46
management of.....	47
marketing.....	45
moth in it, cure for.....	48
DISEASES of Bees.....	79
DIVIDING COLONIES.....	65
DIVISION BOARD.....	64
DRONES, when necessary in a hive.....	17
DYSENTERY.....	79
EXTRACTED HONEY.....	49
FACTS worth Remembering.....	58
FEEDING, when and how to be done.....	75
FERTILE WORKERS.....	70
FOUL BROOD—Cure for.....	79
FRAME of Transferred Comb.....	72
Stand for.....	61
FRUIT TREES, do Bees injure them?.....	34
GLASSING BOXES.....	42
HIVES, the New Langstroth.....	36
a good one necessary.....	35
box, how to examine.....	29
bees marking location of.....	31
making them.....	43
movable-frame.....	38
nucleus colonies, how made.....	64
position in the Apiary.....	28
what Hive to use.....	35
HONEY Bloom.....	34
honey boxes.....	39
extracted.....	49
for sauce.....	47
grading.....	47
marketing.....	47
HONEY EXTRACTOR.....	49
comb basket and strainer.....	51

	PAGE.
HONEY EXTRACTOR—continued,	
how and when to use.....	49, 51
knives for.....	52
wire comb baskets for.....	51
HONEY KNIFE.....	52
HONEY-PRODUCING PLANTS.....	33
INTRODUCTION of Queen Cell.....	60
ITALIAN BEES.....	59
ITALIANIZING an Apiary.....	59
LANGSTROTH HIVE and FRAME.....	36
LOCATION—changing, and marking it.....	31
LOCATION of Apiary.....	26
LUCK or SCIENCE? Which?.....	33
MANDIBLE of Queen.....	60
MARKETING HONEY.....	46
crate for prize boxes.....	46
MOORE's Honey Box.....	40
MOVING COLONIES.....	28
NATURAL HISTORY of the Bee.....	11
NATURAL SWARMS—how to care for.....	68
how to prevent them.....	65
NUCLEUS COLONIES—care of.....	65
POLLEN or Bee Bread.....	24
PROPOLIS or Bee Glue.....	24
PRIZE HONEY BOX—description of.....	39, 46
QUEEN (Italian).....	13
cages (for shipping).....	79
clipping wing of.....	33, 68
development of.....	13
laying of.....	16
never to be absent.....	69
ovaries of.....	15
piping of.....	68
shipping of.....	79
QUEEN CELLS.....	62
figure of.....	63
how to secure.....	62
introduction of.....	62
QUEEN NURSERY, its use and value.....	66
QUEEN REARING.....	66
QUEEN REGISTERING SLATES.....	67
QUEENLESSNESS.....	70
RACES of the Honey Bee.....	13
ROBBING, how to prevent.....	75
SAW—circular foot power.....	43
hand circular rip saw.....	44
SECTIONS—Dovetailed, &c.....	39
SEPARATORS—how used.....	38
SHIPPING CRATES.....	41
SMOKERS—how and when to use.....	77
SHIPPING QUEENS and COLONIES.....	78
SPRING DWINDLING.....	33
SPRAYING BEES with Atomizer.....	62
STARTING an Apiary.....	25
STINGS.....	78
SWARMING, how prevented.....	65
after-swarms.....	68
hiving swarms.....	69
purchasing.....	36
TIN POINTS for glassing honey.....	42
TRANSFERRING BEES.....	72
best method of doing it.....	73
UNITING WEAK COLONIES.....	74
VALENTINE's FRAME STAND.....	61
WAX, how produced and secured.....	20, 57
WAX EXTRACTOR.....	57
WINTERING, requisites to safe.....	32
WORKERS, figure and function of.....	17, 19
pollen baskets of.....	71

THE BEST IS THE CHEAPEST! COFFINBERRY'S EXCELSIOR HONEY EXTRACTOR!

From Eight to Fourteen Dollars.

Having made several improvements in the EXCELSIOR EXTRACTOR for 1879, it is now offered to the Bee-Keepers of America as the **MOST PERFECT MACHINE IN THE MARKET.** The universal favor with which the EXCELSIOR EXTRACTOR was received in 1878, has induced other manufacturers to adopt several of its improvements. My experience and experiments of last season, with the assistance and suggestions of skillful workmen, have enabled me to perfect an Extractor that **cannot be excelled, and can only be equaled by being closely imitated.**

The Excelsior is made entirely of metal, and is consequently very light, strong and durable, with lugs at the bottom for firmly attaching to the floor if desired.

The strong over-motion gearing, so necessary to ease in running and speedy operating, was designed and is manufactured expressly for the Excelsior. A child ten years of age can operate the machine as rapidly as it can be supplied with combs.

The top or cross-band, to which is attached the gearing, is wrought iron, three inches broad, with the ends turned down in such manner as to thoroughly brace and strengthen the can, and holding the basket firmly in an upright position.

The Comb Basket having vertical sides, insures the extracting power alike for top and bottom of frames. The sides of the basket being movable and interchangeable, greatly facilitate the operation of dusting before and thoroughly cleaning after use if desired.

The basket can be taken from or replaced in the can in a moment, there being no rusty screws to take out or nuts to remove.

At the bottom of the can, and below the basket, is a cone or metal standard, in the top of which revolves the bottom pivot of the basket, thereby giving room for sixty or seventy pounds of honey without touching the basket or pivot below.

Nos. 3, 4 and 5 have strainers covering the canal leading to the faucet, which obviate the delay of several hours in waiting for the honey to settle, and the tedious and wasteful process of skimming. The faucet being below the bottom level of the honey, renders unnecessary the usual tipping and wrenching incident to drawing off the honey. These also have close-fitting metal covers, which entirely exclude dust, dirt, flies and bees when not in use.

The baskets of Nos. 4 and 5 have no center rod running from top to bottom, which will be found very convenient by those who uncap both sides of the comb before putting in the basket, as they can be turned without removal.

The strong iron handles placed at the sides, a little above the center, are completely side-braced, and add much to convenience in handling.

The wire baskets are very neat specimens of skillful workmanship, thoroughly braced at every point where experience has proven it to be most requisite, and nothing has been omitted that could add to its efficiency.

The No. 4, for **three** frames, has a triangular basket, movable sides, no center rod, runs smoothly regardless of number of frames, and is fast superseding the demand for four-sided baskets.

A LOWER PRICED MACHINE.

A cheaper machine being called for by those having but few colonies, and not making a specialty of bee-keeping, I have made a special size to take the Langstroth frame, and one for the American, to sell at **\$8.00** each. These have no covers or strainer, and are smaller than the \$12.00 and \$14.00 sizes, but for the frames named are equal to the others for effective work, and are the **best cheap Extractors made.**

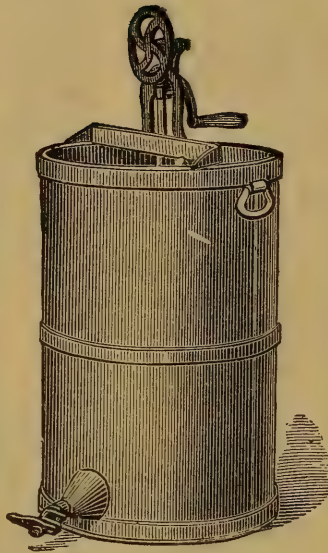
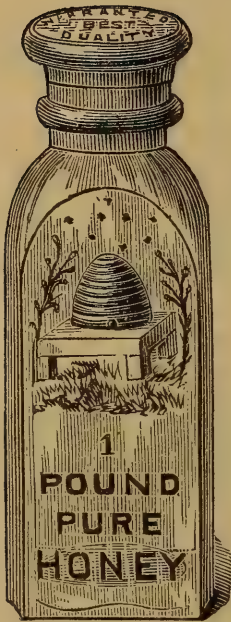
Sizes and Prices:

No. 1.—For 2 Langstroth frames, 10x18 inches.....	\$8 00
" 2.—For 2 American frames, 13x13 inches.....	8 00
" 3.—For 2 frames, 13x20 inches, or less (which embraces all standard sizes)	12 00
" 4.—For 3 " " " " " " " " " "	12 00
" 5.—For 4 " " " " " " " " " "	14 00

☞ A liberal discount to dealers in Bee-Keepers' supplies and to parties ordering in quantity. Address, **C. C. COFFINBERRY, Chicago, Ill.,**

Or **American Bee Journal, Chicago, Ill.,** where samples can be seen.





Bienenstöcke mit beweg- lichen Gestellen.

Honig-Pumpen.

Italienische Bienen u. Königinnen.

Bienen-Räucherer, Bienenschleier, Gummi-
Handschuhe, Künstliche Honigscheiben-
Fundamente, Saamen für Honig-
Pflanzen,

sowie Alles, was Bienenzüchter gebrauchen.

Zu verkaufen bei:

Thomas G. Newman.

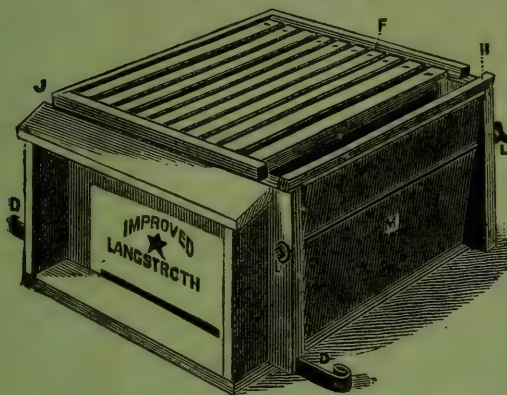
Herausgeber des

"The American Bee Journal."

The American Bee Journal wird monatlich heraus-
gegeben und kostet \$1. per Jahr im Voraus. Es ist die
älteste Bienen-Zeitung in der Welt, die erfolgreichsten
und gebildetsten Bienenzüchter in Europa und Amerika
schreiben für ihre Spalten.

Thos. G. Newman & Son, 974 W. Madison st., Chicago.

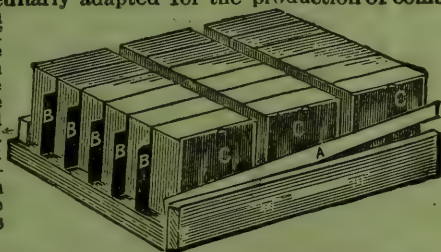
NEW LANGSTROTH BEE HIVE, WITH MANIPULATING SIDE.



This Improvement in the old Langstroth Hive is exceedingly valuable, as it allows the closest watching of a colony with the greatest ease and comfort. By turning the thumb-screw (L) and opening the movable side (which takes but an instant), the frames can be examined, and by removing the loose side-board (M), the bottom-board may be cleaned—giving all the advantages claimed for a loose bottom-board, without its disadvantages.

This Hive is a combination of the Langstroth Hive and the North Star Hive—as patented June 5, 1877—and, no doubt, will gain universal approbation as soon as its advantages are known.

The New Langstroth Hive is peculiarly adapted for the production of comb honey—its Honey Rack is the best in use, and is adapted to the use of the Prize Boxes. It holds 18 Prize Boxes, with the separators between them, marked B B in the cut. The wedge (A) holds all with a vise-like grasp. The outer boxes are glassed as they stand on the hive (C C C). By removing the wedge (A) any box may be instantly removed, examined, returned, or replaced by an empty one—the spaces between the rows readily admitting the fingers for that purpose.



SAMPLE NEW LANGSTROTH HIVE—Nailed, Not Painted.

- | | |
|--|--------|
| No. 1.—Brood Chamber, 10 frames, portico, $7\frac{1}{2}$ -inch cap—no surplus arrangement..... | \$2 00 |
| No. 2.—Same as No. 1, with Comb-Honey Rack, complete, same as shown by the above cuts..... | 3 00 |
| No. 3.—Same as No. 1, but having 24 frames, and Comb-Honey Rack—a complete 3-story hive..... | 3 75 |
| No. 4.—Brood Chamber, 10 frames, and 7-inch story, with 7 cases containing Prize Boxes and tin Separators, for surplus Honey, with 2-inch cap..... | 3 00 |
| No. 5.—Same as No. 4—but having 10 extra frames—a complete 3-story hive.. | 3 75 |
| No. 6.—Brood Chamber, with 10 extra frames, for extracting, and 2-inch cap, | 3 00 |

If painted, add \$1.00 each.

MATERIAL FOR NEW LANGSTROTH HIVES.

CUT, READY TO NAIL—($14\frac{1}{8} \times 18\frac{3}{8}$ inches inside).

In lots of 5....No. 1—(one-story), \$1 25	In lots of 5....No. 6—(two-story), \$1 80
“ 10.... “ “ “ 1 20	“ 10.... “ “ “ 1 70
“ 25.... “ “ “ 1 10	“ 25.... “ “ “ 1 60
“ 50.... “ “ “ 1 05	“ 50.... “ “ “ 1 55
“ 100.... “ “ “ 1 00	“ 100.... “ “ “ 1 50

MATERIAL FOR LANGSTROTH FRAMES.

CUT, READY TO NAIL—($9\frac{1}{8} \times 17\frac{5}{8}$ inches outside).

100 frames.....\$1 50	1,000 frames.....\$14 00	5,000 frames, per 1,000..\$12 00
-----------------------	--------------------------	----------------------------------

For sale at wholesale and retail. Address

SPERRY & CHANDLER, 974 W. Madison St., CHICAGO,

Or at the **AMERICAN BEE JOURNAL OFFICE.**

We supply Books for Bee-keepers and others at Publisher's prices.



COMPRISING

**ITALIAN QUEENS,
FULL COLONIES,
Movable-Frame Hives,
Honey Extractors,**

BEE VEILS, RUBBER GLOVES,
ARTIFICIAL COMB FOUNDATION,
BEE SMOKERS,

Seeds for Honey Plants,

—AND—

Everything used by Bee-Keepers, for Sale by
THOS. G. NEWMAN & SON, Chicago.

Every Bee-Keeper should take



IT IS THE
Oldest, **Largest,**
AND MOST
Reliable **Bee-Paper**
IN THE WORLD!



It is the best scientific and practical Journal
of APICULTURE ever published. The most
successful and experienced Bee-keepers in
Europe, as well as America, write for it.

—:O:—

TERMS: \$1.50 PER ANNUM.

A Sample Copy sent for **10 cts.**

Address, THOS. G. NEWMAN & SON,
CHICAGO, ILL.

Send for our new Illustrated Catalogue of Implements for the Apiary.

LIBRARY OF CONGRESS



0 002 841 773 1